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NEW AMERICAN SERIES.

GRADED PROBLEMS

IN

ARITHMETIC AND MENSURATION.

REVISED AND ENLARGED.

BY

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PHILADELPHIA:

E. H. BUTLER & CO.

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PREFACE.

WHATEVER text-book on arithmetic is used, the necessity for a work of this kind is felt by every teacher, from the fact that fresh problems stimulate investigation, while a review of those that have been in use for a term often fails to produce results proportionate to the expenditure of time.

About 3500 examples are here furnished, graded on the plan of the New American Arithmetics, yet in such manner that the book will readily supplement any other series.

To make the work complete in itself, all the necessary rules and tables have been added, together with a number of questions on the principles of arithmetic and mensuration, for reviews and examinations.

It is believed that pupils who master the problems here presented will find no difficulty in solving any fair question in arithmetic.

NOTICE TO TEACHERS.

The rearrangement of the present edition of the Graded Problems into Parts I. and II. is to permit the publication of the parts separately, and is in accordance with the suggestions of a number of prominent teachers.

New problems have been added, as follows: Part I., pages 46, 47, 48, 49, 84, 85, 86, 87, 88; Part II., pages 8, 65, 66, 67, 68.

The Questions, Rules, and Tables have been transferred to their appropriate places, but in all other respects the same order of arrangement has been observed as heretofore.

S. MECUTCHEN.

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PART I.

GRADED PROBLEMS IN ARITHMETIC.

SIMPLE NUMBERS.

NOTATION AND NUMERATION.

WRITE the following numbers, and then read them:

1. 1011; 1467; 109705; 6001701; 90456060.

2. 2000604; 5937501; 105032106; 796520020.

3. 706500056; 90001002030; 8675941032101.

4. 1173659120536805; 10110101001601.

5. 6001060; 100000001; 9520052; 6066606006.

6. 75009; 9006865; 56900081; 8008001; 10000.

7. 85610001055; 2022600505001; 900987455.

Write the following in figures:

8. Eight hundred and sixty-seven thousand two hundred.

9. Sixty thousand and six. Ten million. Five thousand.

10. Eight hundred million and eight. One trillion.

11. Sixteen million eleven thousand and one.

12. Six million and ninety-six. Ten trillion and one.

13. Nine hundred and fifty-four million seven hundred and sixty-one thousand and nine.

14. One hundred million ten thousand and one.

15. Ninety million six hundred and two.

16. Twelve thousand two hundred and twelve.

17. Ten thousand nine hundred and nine.

18. Thirteen thousand seven hundred and six.

19. Twenty-five thousand and twenty-five.

ADDITION.

ADD—

(20.)	(21.)	(22.)	(23.)
673219	9215460	1098537	9135708
50185	732816	53294	619427
5136928	5427095	687195	49628
4372	45382	50961	819351
805670	865149	195238	1083467
1732489	7286320	4697	923054

(24.)	(25.)	(26.)	(27.)
3496570	7165210	1453210	9421568
756489	914259	651192	731824
15728	70489	932718	47625
1876546	653578	816731	5164
712590	95327	9489421	708524
69584	46372	1357812	63249

28. 15236 + 61942 + 4126 + 659 = what?

29. 6954 + 93258 + 8576 + 1054 = what?

30. 875 + 60694 + 9756 + 84321 = what?

31. 97561 + 12654 + 8205 + 542 = what?

32. 7056 + 694 + 79624 + 8975 = what?

33. 6569 + 482 + 82961 + 1234 = what?

34. 7549 + 1267 + 75904 + 429 = what?

35. 8597 + 64321 + 1291 + 654 = what?

36. 97501 + 46378 + 729 + 4865 = what?

37. 75406 + 596 + 7564 + 7421 = what?

38. Add five hundred and sixteen thousand and ninety-six, sixteen thousand four hundred and two, and nine hundred and sixty-two.

39. Add five thousand and eighty-seven, ninety-six thousand five hundred and forty-seven, and six hundred and fourteen.

40. Add one million six hundred and eleven thousand and fifty, nine hundred and forty-two thousand seven hundred and eighty-six, and six hundred and ninety-five.

41. Add one million nineteen thousand six hundred and twelve, ninety-one thousand five hundred and sixty-eight, and twelve thousand and twenty-nine.

42. Add five hundred and twenty-six, ten thousand nine hundred and forty-two, and one thousand and ninety-seven.

43. Add seventeen thousand and sixty-nine, nine thousand eight hundred and sixteen, and seven hundred and fifty-two.

44. Add twenty-six thousand nine hundred and forty-three, nine thousand seven hundred and fifty-six, and four hundred and nineteen.

45. Add eighteen thousand and ninety-five, nine thousand seven hundred and six, and eight hundred and eighty.

46. Add one thousand nine hundred and ninety-seven, eighteen thousand eight hundred and forty-one, and four hundred and ninety-six.

47. Frank has 211 marbles, John has 143, and William has 97; how many marbles have they altogether?

48. Jane has 193 chestnuts, and Mary has 48 more than Jane; how many chestnuts have both?

49. A man paid 17 cents for some sugar, 29 cents for some meat, and 36 cents for a pound of butter; how much did he pay in all?

50. Minnie has 19 plums, Sarah has 27, and William has 29 more than both; how many plums has he?

51. A farmer has 237 cows in one field, 429 in another, and 144 in a third; how many cows has he altogether?

52. A traveler walked 63 miles the first day, 56 miles the second, and 35 miles the third; how far did he walk in the three days?

53. A boy had 76 marbles; his brother gave him 49, his sister gave him 27, and he bought 17; how many marbles had he then?

54. A gunner killed 47 birds the first day, the second day he killed 34 more than he did on the first, and the third day he killed as many as he had killed on both the other days; how many birds did he kill in all?

SUBTRACTION.

55. From five million two thousand and nineteen take ninety thousand and seventy-four.

56. Subtract one million and eight from two billion.

57. From seventy thousand and ten take ten thousand and six.

58. Subtract sixty million four thousand and sixty-four from seventy-nine million two thousand and two.

(*59.*)	(*60.*)	(*61.*)	(*62.*)
6594321	19804236	165947820	657249
3875961	18946517	129847838	569168

(*63.*)	(*64.*)	(*65.*)	(*66.*)
182791240	123579468	84230167	17923540
179365128	102546879	76541259	11234569

(*67.*)	(*68.*)	(*69.*)	(*70.*)
65219080	67905043021	75321415	1652140
51429657	45186876589	64812369	976427

(*71.*)	(*72.*)	(*73.*)	(*74.*)
91237061	97654230	103467598	81257640
81787465	63143127	98675342	70185376

75. From fifteen million six hundred and twelve thousand three hundred and forty subtract four million seven hundred and fifty-three thousand four hundred and ninety-six.

76. Subtract seven million fourteen thousand nine hundred and sixty-six from seventeen million one hundred and twelve.

77. From two hundred thousand take ninety-six thousand four hundred and seventy-eight.

78. Subtract nine hundred and ninety-eight thousand eight hundred and eleven from one million.

79. From twenty-five thousand and thirty-one take fourteen thousand seven hundred and ninety-six.

80. Subtract eight hundred and fifty-eight thousand six hundred and seventy-four from nine million and sixteen.

81. 7562149 – 352490 = how many?

82. 123594 -- 96527 = how many?

83. 3465401 – 2854919 = how many?

84. 14294671 – 4895410 = how many?

85. 74286020 – 69752098 = how many?

86. 8149012 – 8099992 = how many?

87. 7000000 – 529658 = how many?

88. What number must be subtracted from 170040, to give 69853 as the remainder?

89. A party of gunners killed 153 birds out of a flock of 349; how many birds remained?

90. A boy had 97 marbles; he lost 28, and then bought 31; afterwards he lost 53; how many marbles had he left?

91. The difference of two numbers is 659, and the greater number is 1251; what is the other?

92. A man bought 129 sheep, and then had 233; how many sheep had he at first?

93. Sixty-five cows out of a herd of 319 died of disease; then 48 were sold; how many cows remained?

94. An army of 10000 men lost 4809 men in one battle, and 2203 in another; how many men were left?

95. Out of a cargo of 460 bales of cotton, 179 bales were thrown overboard in a storm to lighten the ship; how many bales were left?

96. The minuend is 764070, and the subtrahend is 695431; what is the remainder?

97. The minuend is 10190712, and the subtrahend is 6581275; what is the remainder?

98. The minuend is 9008401, and the remainder is 9800; what is the subtrahend?

99. The minuend is 604290, and the remainder is 10931; what is the subtrahend?

100. The remainder is 19604, and the subtrahend is 65276; what is the minuend?

101. The subtrahend is 3599, which is 921 less than the remainder; what is the minuend?

MULTIPLICATION.

102. MULTIPLY 673 by 142; by 96; by 11.

103. Multiply 7259042 by 7; by 78; by 642.

104. Multiply 654327 by 9; by 53; by 127.

105. Multiply 1096517 by 10; by 49; by 606.

106. Multiply 965742 by 6; by 38; by 597.

107. Multiply 765031 by 5; by 27; by 942.

108. Multiply 104923 by 14; by 97; by 716.

109. Multiply 1604792 by 16; by 77; by 928.

110. Multiply 1904621 by 7; by 19; by 979.

111. Multiply 75604 by 17; by 25; by 697.

112. Multiply 65742 by 16; by 38; by 476.

113. Multiply 781964 by 3; by 48; by 712.

114. Multiply 68174 by 19; by 26; by 905.

115. Multiply 816714 by 15; by 63; by 649.

116. Multiply 123760 by 11; by 33; by 809.

117. $75219 \times 91206 =$ what? $5789 \times 168 =$ what?

118. $5764 \times 6509 =$ what? $5832 \times 105 =$ what?

119. $7904 \times 5511 =$ what? $105 \times 103 =$ what?

120. $97065 \times 4526 =$ what? $120 \times 117 =$ what?

121. $87065 \times 546 =$ what? $729 \times 717 =$ what?

122. $47605 \times 63 =$ what? $1085 \times 1085 =$ what?

123. $59673 \times 9001 =$ what? $964 \times 649 =$ what?

124. $705432 \times 8065 =$ what? $8170 \times 6000 =$ what?

125. $369781 \times 4681 =$ what? $2921 \times 1235 =$ what?

126. $75213 \times 87991 =$ what? $1728 \times 5238 =$ what?

127. The multiplicand is 659320, and the multiplier is 7325; what is the product?

128. The multiplicand is 7639051, and the multiplier is 3976; what is the product?

129. The multiplicand is 379564, and the multiplier is 6457; what is the product?

130. The multiplicand is 460971, and the multiplier is 74201; what is the product?

131. The multiplicand is 754006, and the multiplier is 93200; what is the product?

132. The multiplicand is 475064, and the multiplier is 349; what is the product?

133. The multiplicand is 790416, and the multiplier is 97; what is the product?

134. The multiplicand is 426807, and the multiplier is 97135; what is the product?

135. The multiplicand is 76428, and the multiplier is 689; what is the product?

136. The multiplicand is 94685, and the multiplier is 1653; what is the product?

137. The multiplicand is 842657, and the multiplier is 2769; what is the product?

138. The multiplicand is 742389, and the multiplier is 1524; what is the product?

139. The multiplicand is 539284, and the multiplier is 1826; what is the product?

140. What number multiplied by itself equals 64? 49? 144? 81? 36? 1? 25? 121? 9? 100? 16? 4?

141. What will be the cost of building 506 houses, at 4898 dollars per house?

142. A cloth merchant bought 70 pieces of cassimeres, each piece containing 51 yards, at 4 dollars a yard; what was the whole cost?

143. What is the product of 999×999?

144. If it requires 86400 seconds to make a day, how many seconds are there in 365 days?

145. There are 32000 ounces in one ton; how many ounces in 888 tons?

146. There are 6272640 square inches in an acre; how many square inches in 125 acres?

147. 1728 cubic inches make a cubic foot; how many cubic inches in 27 cubic feet?

148. How many letters are there in a book of 164 pages, if there are 36 lines on each page and 48 letters in each line?

DIVISION.

149. DIVIDE 678942 by 9; by 74; by 641.

150. Divide 972618 by 6; by 64; by 375.

151. Divide 28602 by 18; by 126; by 681.

152. Divide 680 by 17; by 40; by 8.

153. Divide 57885 by 3; by 51; by 3405.

154. Divide 25488 by 9; by 108; by 531.

155. Divide 48144 by 4; by 48; by 1003.

156. Divide 65402 by 2; by 106; by 617.

157. Divide 88848 by 8; by 36; by 1851.

158. Divide 528544 by 3; by 156; by 3324.

159. Divide 465360 by 7; by 140; by 3878.

160. Divide 279672 by 4; by 86; by 813.

161. Divide 7995306 by 11; by 138; by 1518.

162. Divide 35595 by 5; by 45; by 791.

163. Divide 2543925 by 3; by 317; by 535.

164. $64192 \div 1003 =$ what? $268056 \div 657 =$ what?

165. $186558 \div 186 =$ what? $179775 \div 765 =$ what?

166. $186558 \div 31 =$ what? $7520415 \div 2345 =$ what?

167. $1717350 \div 642 =$ what? $594992 \div 907 =$ what?

168. $46844 \div 1673 =$ what? $5497800 \div 175 =$ what?

169. $81126 \div 4507 =$ what? $721298 \div 291 =$ what?

170. $96197 \div 5063 =$ what? $96768 \div 1728 =$ what?

171. $6456183 \div 87 =$ what? $26649 \div 27 =$ what?

172. $24964128 \div 7686 =$ what? $21448 \div 2681 =$ what?

173. The dividend is 224677152, and the divisor is 854; what is the quotient?

174. The dividend is 1147683600, and the divisor is 165; what is the quotient?

175. The dividend is 167610643200, and the divisor is 190; what is the quotient?

176. The dividend is 167610643200, and the divisor is 323; what is the quotient?

177. The dividend is 167610643200, and the divisor is 187; what is the quotient?

REVIEW PROBLEMS.

178. $16742 + 1329476 \times (642 - 139) =$ what?

179. A man bought 310 sheep for \$1860; after 15 of the sheep had died, he sold 135 of those left for \$675, and the remainder at \$7 apiece; did he gain or lose, and how much?

180. Subtract 943615 from 1000000, and divide the remainder by 45.

181. A man paid \$85 for a horse, \$315 for 12 cows, and \$27 for some sheep; how much will he have left out of a \$500 bill?

182. Multiply 6434 by 927, and from the product take 37406.

183. What is the cost of 27 pieces of cloth, each containing 73 yards, at \$4 a yard?

184. Add six million nine hundred and seventy-one thousand, and five hundred and fourteen thousand six hundred and ninety-three.

(*185.*)	(*186.*)	(*187.*)	(*188.*)
95432	8431	6371	84109
1765	76592	194	9276
9107	8463	46287	613
84326	719	719	39
614	64	84	18705
3297	97653	6458	8176
51068	7064	17506	619
6791	7916	810	1734
184	613	9760	42649

189. How many barrels of flour, at \$9 a barrel, will be required to pay for 36 barrels of apples, at \$2 a barrel?

190. If there are 832500 grains in a bushel of wheat, how much will 14152500 grains cost, at \$1 a bushel?

191. If 24010 chestnuts are divided amongst 49 boys, how many chestnuts will each one get?

192. A man bought 640 sheep for \$3000. He sold 220 of them at \$4 apiece, 250 at \$6 apiece, and the remainder for \$800; how much did he gain?

193. If sixteen million five hundred and ten thousand dollars' worth of railroad stock be divided into three hundred and thirty thousand two hundred shares, what is the value of each share?

194. Divide 1869435 by 405.

195. Divide 642 × 1494 by 9 × 8, and subtract 537 from the quotient.

196. A man sold 10 horses at $650 apiece; he then paid $360 for 10 cows, put $3000 in bank, and paid $140 for a couple of wagons and some farming-utensils; how many tons of hay, at $15 a ton, can he buy with the remainder?

197. How many pounds of butter, at 30 cents a pound, must be exchanged for 24 yards of cloth, at 10 cents a yard?

198. The dividend is 9025, the quotient is 19; what is the divisor?

199. The dividend is 3780, the quotient is 42; what is the divisor?

200. The divisor is 759, which is 465 more than the quotient, and there is a remainder of 65; what is the dividend?

201. 26759422 ÷ 4329 = how many?

202. A man sold his crop of hay for $940; he then bought 15 pigs for $35, a lot of poultry for $25, 40 sheep for $120, and he paid $10 for sundry small articles; how many cows, at $75 each, can he buy with the remainder?

203. If $648 be divided amongst 9 men, how many barrels of flour, at $6 a barrel, can each buy?

204. If 198 inches make a rod, how many rods in 63360 inches?

205. If a man walked 2890 miles in 17 weeks, and walked only 5 days in each week, how many miles did he walk each day?

206. If rope costs 3 cents for 8 feet, how much must be paid for a rope long enough to reach the bottom of the ocean where it is 4 miles deep, there being 5280 feet in a mile?

207. Multiply 641 by 173219 − 72915.

208. The quotient is 30060, which is 29984 more than the divisor; what is the dividend?

209. John has 113 marbles, William has twice as many and 19 more, and Frank has 63 more than both. If each of them lost 25, how many would they all have?

210. Multiply 7695 by 432, and divide the product by 405.

211. Divide 560907 by 9, and subtract 49357 from the quotient.

212. From 223 × 605 take 31625 ÷ 253.

213. Add 869, 1254, 957, and 946, divide the sum by 22, and subtract 149 from the quotient.

214. A man sold 60 bushels of apples, at $1 a bushel; how many pigs, at $3, can he buy with the money he receives?

215. How much will 1642 barrels of flour weigh, if one barrel weighs 196 pounds?

216. A man bought 76 cords of wood, at $5 a cord, 119 tons of coal, at $7 a ton, and 79 tons of hay, at $27 a ton; how much will he gain if he sells them all for $3500?

217. How many bales of cotton, each weighing 194 pounds, can be made from 1392726 pounds?

218. A man sold 1497 bushels of wheat, at 96 cents a bushel, 796 bushels of oats, at 46 cents a bushel, and 635 bushels of corn, at 87 cents a bushel; how many bushels of apples, at 83 cents a bushel, can he buy with the money?

219. A party of 17 men worked a certain number of days; if they had worked 6 days longer than they did, they would have received $391, but if they had stopped 3 days sooner than they did, they would have received $238; how much did each man receive daily?

220. Six thousand three hundred and twenty-eight is 3672 less than the divisor, and 5919 more than the quotient; what is the dividend?

221. Add 537, 649, 72, and 315, multiply the sum by 1374, and subtract 937512 from the product.

222. If there are 8 quarts in a peck, how much will 713 pecks of apples cost, at 4 cents a quart?

223. How many pairs of stockings, at 31 cents a pair, can a farmer buy with the money he gets for 62 pounds of butter, at 47 cents a pound?

224. Multiply $4428 \div 9$ by $869 \div 11$.

225. Multiply $1067 \div 11$ by 643, and add 429 to the product.

226. $11619 + 73296 + 64381 + 1097275 =$ what?

227. A man bought 45 barrels of flour, at \$7 a barrel; 3 barrels were spoiled by an accident; for how much per barrel must he sell the remainder in order to gain \$21 on the whole cost?

228. What will 176 acres of land cost, at \$34 per acre?

229. If a vessel sails 13 miles an hour, how long will it take it to go 4004 miles?

230. If light travels 196000 miles in a second, how long will it take it to go from the sun to the earth, a distance of 95000000 miles?

231. An army of 10000 men lost 1945 in one battle, and 645 in another; how much money did those who were left receive, if each man's pay was \$42?

232. Divide 104511 by 165, and add 1971 to the quotient.

233. The sum of two numbers is 361, and one is 57 less than the other; what are the numbers?

234. A and B together own \$698, and B owns \$60 more than A; how much money does each own?

235. John and James together pay 96 cents for oranges at 3 cents apiece; John buys 6 more oranges than James; how much money did each pay?

236. Subtract 19642 from 20020, and multiply the remainder by 26.

237. From 161423 take 237×569.

238. Add 7641, 12751, 194265, 516, and 12513.

239. What is the cost of 36 oranges, at 15 cents a dozen, 132 eggs, at 33 cents a dozen, and 13 pecks of apples, at 27 cents a peck?

240. How much money must be divided among 117 men in order to give each man \$19?

241. Divide 93123 by 9, and take 9432 from the quotient.

242. If a bushel of corn weighs 58 pounds, how much will a man gain who buys 217 bushels at 93 cents a bushel and sells it at 2 cents a pound?

243. If a ton of hay is worth $27, how many tons of hay should be given for a horse worth $513?

244. $4642 \times 71691 \div 3914 - 1593 =$ how many?

245. $5936742 \times 6430 \div 5787 =$ how many?

246. $1214591 - 319764 =$ how many?

247. A man bought 7 pounds of sugar, at 9 cents a pound, 11 pounds of flour, at 6 cents a pound, and 13 oranges, at 2 cents apiece; how much change will he get out of a $2 bill?

248. If a horse can travel 16 miles an hour, and a locomotive goes 35 miles an hour, how much sooner will a man go 560 miles if he travels on the cars than if he goes on horseback?

249. If a hare, running 13 miles an hour, meets a horse running in the opposite direction at the rate of 11 miles an hour, how far apart will they be 5 hours after the meeting?

250. $(81648 \div 36) \times 47 \times 59 =$ how many?

251. $(71912354 - 68375498) \times 641 + 315 =$ how many?

252. $(756 \div 63) \times (918 \div 51) =$ how many?

253. $2643 + 792 + 639172 + 16743 - 542193 =$ how many?

254. A man bought sheep at $3 apiece; how many should he give in exchange for 6 tons of hay, at $16 per ton, in order to gain $27?

255. A man bought a cask of cider, containing 59 gallons, for $20.75; seven gallons leaked out, and after he had sold 42 gallons he found that the remainder had soured, and this he sold as vinegar, at 36 cents per gallon. At what rate per gallon did he sell the 42 gallons of cider if he gained $4.27 altogether?

256. Two men set out to walk 323 miles; A started on Monday, and walked 17 miles a day; B started on Tuesday, and walked 19 miles a day. Which one finished first, and when he finished how far ahead of the other was he?

257. How many horses worth $125 apiece must be given for a farm worth $11000?

258. The sum of five equal numbers is 100400; what is each number?

259. What number increased by itself equals 6008?

260. What number multiplied by the difference between 455 and 830 will give 757500 as the product?

261. What number diminished by 5989 will give a remainder equal to the subtrahend?

262. One thousand nine hundred and eighty-nine is 1011 less than the divisor, and the quotient is equal to the divisor; what is the dividend?

263. If 6 men do a piece of work in 10 days, in what time can 60 men do it?

264. A and B together own $675, A owning $243 more than B. If B can buy 24 barrels of flour with his money, how many barrels at the same rate can be bought with A's money?

265. Two men together own 897 acres of land; if the first should sell 102 acres of his, he would have 33 acres less than the second. How many acres has each?

266. If I buy 483 acres of land for $36225, and sell 375 acres at $6 more per acre than it cost, and the remainder at $8 less per acre than it cost, do I gain or lose, and how much?

267. A man earns $12 a week; he pays $5 a week for his board, and his other expenses amount to $2 a week. In how many weeks can he save enough to pay for a suit of clothes worth $35?

268. A man bought 29 horses and cows for $1940; he bought 3 more cows than horses, and the horses cost $100 apiece; what did he pay for one cow?

269. The product of three factors is 3696; two of the factors are 12 and 22; what is the third factor?

270. What number divided by 2090 will give a quotient equal to the divisor?

271. The House of Representatives has 216 more members than the Senate, and there are 368 members in both houses of Congress. How many Senators are there?

272. If 56 be multiplied by itself, and the product by another number, the result will be 78400; what is that other number?

273. If a certain number be multiplied by 24, and the product be diminished by 699, the result will be 1101; what is the number?

274. How many times can 3750 be subtracted from 1128750?

275. I paid $11250 for land at $25 per acre. I sell to A 270 acres of it for $7290, and the rest to B, so that I neither gain nor lose on the whole. What does B pay per acre?

276. What number divided by 457 will give the quotient 1129 and the remainder 452?

277. If 10 men can dig a ditch in 24 days, in how many days can they do the same amount of work with the help of 5 more men?

278. Bought a plantation for $15000, and after paying $3250 for improving it, I sold one-half of it for $8250, at $110 an acre. How many acres of land did I buy, and at what price per acre?

279. A grocer bought 130 bags of coffee at $5 per bag, and 115 bags at $4 per bag; how much would he gain by selling the whole at $6 per bag?

280. $(3005 - 1994) \times (170 \div 5) - (320 \times 16) =$ how many?

281. A grocer bought 2555 pounds of sugar at 11 cents a pound; he sold 1560 pounds at 12 cents a pound, and the remainder at 10 cents a pound. How much did he gain?

282. What is the cost of 1776 farms, each containing 225 acres, at 65 dollars an acre?

283. What number increased by ten times itself is equal to 250 less than 1350?

284. 1728 is the divisor and the quotient of a certain number; what is the number?

UNITED STATES MONEY.

WRITE in figures each of the following quantities:

1. Six dollars fifty-six cents two mills.
2. 10 dollars 8 cents. 1 dime 2 mills.
3. 13 dollars 9 dimes 6 cents.
4. 101 dollars 62 cents 9 mills.
5. 7 dollars 6 cents 6 mills.
6. 100 dollars 1 mill.
7. 8 dimes 5 cents 3 mills.
8. 16 dollars 50 cents 5 mills.
9. 716 dollars 9 dimes 6 mills.
10. 1001 dollars 5 cents 1 mill.
11. 261 dollars 8 dimes 6 cents.
12. 1674 dollars 90 cents 9 mills.
13. 97140 dollars 5 dimes 4 mills.

Read or write in words the following:

14. $709.005; $60.40; $900.040; $7.01.
15. $9.705; $1790.5; $1975.01; $4.681.
16. $17.50; $71.509; $4682.01; $.46.
17. $468.10; $41.974; $9.417; $60.01.
18. $6.001; $90.053; $6.401; $6.41.
19. $.89; $.905; $60.75; $16.820.
20. $1.80; $61.40; $24.67; $110.19.
21. $.09; $.677; $.010; $350.005.
22. $67.02; $68.430; $9.007; $1.175.
23. $671.671; $90.409; $73.65.
24. $.895; $.076; $.005; $17.00.
25. $67.670; $70.607; $7432; $5.005.
26. $84.26; $84.265; $7.90; $306.012.
27. $.795; $5.79; $421.06; $125.00.
28. $86.402; $91.06; $83707.009.

CASE I.

29. Reduce 1927 dollars to dimes; to cents.
30. Reduce 27191 eagles to dollars; to mills.
31. Reduce 9990 dimes to cents; to mills.
32. Reduce 67895 double eagles to dimes.
33. Reduce 87641 eagles to dimes; to cents.
34. Reduce 75672 double eagles to dollars.
35. Reduce 33333 eagles to cents; to mills.
36. Reduce 1640 dimes to cents; to mills.
37. Reduce 90 eagles to dollars; to mills.
38. Reduce $200 to dimes.
39. Reduce $10 to dimes.
40. Reduce 146 dimes to mills.
41. Reduce 23 eagles to cents.
42. Reduce 14 eagles to mills.
43. Reduce 714 double eagles to dollars.
44. Reduce 264 eagles to dollars.
45. Reduce 1642 dollars to mills.
46. Reduce $375 to cents.
47. Reduce $1654 to dimes.
48. Reduce 256 dimes to cents.
49. Reduce 34 dimes to mills.
50. Reduce 126 double eagles to mills.
51. Reduce 648 double eagles to cents.
52. Reduce 137 cents to mills.
53. Reduce $111 to dimes.
54. Reduce $64 to mills.
55. Reduce 24 eagles to cents.
56. Change ninety-six eagles to mills.
57. Change sixty-five dollars to cents.
58. Change seven hundred and forty-two dimes to mills.
59. Change twenty-five double eagles to mills.
60. Change two thousand and nine dollars to mills.
61. Change six hundred eagles to cents.
62. Change seventy-nine dollars to dimes.

63. Change sixteen double eagles to mills.

64. Change nine hundred eagles to dimes.

65. Change ninety-seven thousand dollars to mills.

66. Change four thousand and seventeen eagles to cents.

67. Change three hundred and seventy-eight double eagles to dollars.

68. Change six hundred and seventeen dimes to mills.

69. Change seventy-four dimes to cents.

70. Change sixty-five dollars to dimes.

71. Change fifty-six thousand and forty-eight eagles to dimes.

72. Reduce \$64.09 to cents; \$125 to mills.

73. Reduce \$78.309 to mills; \$189.15 to cents.

74. Reduce \$700.90 to cents; \$799.92 to mills.

75. Reduce \$606.04 to mills; \$100.01 to cents.

76. Reduce \$87.09 to cents; \$906.17 to mills.

77. Reduce \$1.06 to mills; \$2500 to dimes.

78. Reduce \$714 to cents; \$15800 to mills.

79. Reduce \$64.09 to mills; \$756.19 to cents.

80. Reduce \$82.08 to cents; \$199 to mills.

81. Reduce \$.06 to mills; \$3680 to mills.

82. Reduce \$10.60 to cents; \$189.05 to dimes.

83. Reduce \$16.05 to mills; \$444 to dimes.

84. Reduce \$900.06 to cents; \$879.25 to mills.

85. Reduce \$18.70 to mills; \$7500 to cents.

86. Reduce \$614.67 to mills; \$35.60 to dimes.

87. Reduce \$71.40 to cents; \$1849 to cents.

88. Reduce \$1.706 to mills; \$27.27 to mills.

89. Reduce \$5.06 to cents; \$.25 to mills.

90. Reduce \$1.65 to mills; \$10.10 to dimes.

91. Reduce \$16.06 to cents; \$980 to cents.

92. Reduce 214 dollars 6 cents to cents.

93. Reduce 60 dollars 4 dimes 1 cent to mills.

94. Reduce 5 dollars 5 dimes 8 mills to mills.

95. Change 4 dimes 7 cents to cents.

96. Change 1617 dollars 67 cents to mills.

97. Change 160 dollars 16 cents to cents.

CASE II.

98. How many dollars in 99875 cents?
99. How many dimes in 88987 mills?
100. How many double eagles in 800000 mills?
101. How many eagles in 40004 dimes?
102. How many cents in 530645 mills?
103. How many dollars in 798764 cents?
104. How many dollars in 1175 dimes and 750 cents?
105. How many dimes in 3000 cents and 500 mills?
106. How many dollars in 4250 cents and 84 mills?
107. How many dollars in 1960 dimes?
108. How many dollars in 17120 cents?
109. How many dollars in 784000 mills?
110. How many dollars in 17840 dimes?
111. How many eagles in 720 dollars?
112. How many eagles in 16300 dimes?
113. How many eagles in 311000 cents?
114. How many double eagles in 68460000 mills?
115. How many dimes in 1700 mills?
116. How many dimes in 1640 cents?
117. How many eagles in 11000 cents?
118. How many double eagles in 61400 dollars?
119. How many cents in 7000 mills?
120. How many dollars in 600 dimes and 600 cents?
121. How many eagles in 60 dollars and 600 dimes?
122. How many dollars in 700 dimes and 600 cents?
123. How many dimes in 6000 mills?
124. How many dimes in 6000 cents?
125. How many dollars in 800 cents?
126. How many dollars in 16000 mills?
127. How many double eagles in 160 dollars and 8000000 mills?
128. How many eagles in 10100 dimes and $1100?
129. How many dollars in 60060 dimes?
130. How many dimes in 21000 mills?

131. How many dollars in 31000 mills?

132. How many cents in 1010 mills?

133. A car company received 17850 pennies in one week; how many dollars did they receive?

134. A man sent $16000 worth of gold to the mint to be coined into eagles; how many eagles ought he to receive?

135. A man exchanged 16400 dimes for dollars; how many did he get?

136. A man exchanged 7160 dimes and 1200 cents for dollars; how many did he receive?

137. A man had 1200 cents; how many dollars had he?

138. If a man exchanged 6000 cents for dollars, how many less coins would he have after the exchange than before it?

139. How many eagles will a man get for $600 and 1000 cents?

140. A man exchanged 1600 cents and 80 dimes for dollars; how many more coins did he have at first than after the exchange?

141. How many eagles will a man get for 6000 cents?

142. If 275 double eagles are exchanged for dimes, what is the difference between the number of coins received and the number exchanged?

143. How many eagles in two hundred and thirty thousand three hundred dollars?

144. How many dimes in one million three hundred and seventy thousand mills?

145. Paid one hundred and twenty thousand dimes for a house; how many eagles did it cost me?

146. How many double eagles can I obtain for eight hundred thousand dimes and forty dollars?

147. The value of an estate is seven hundred and fifty thousand one hundred mills; what is its value in dollars and cents?

148. What is the least number of United States coins that will pay a debt of $100.15?

149. How many dollars in 93550 cents?

ADDITION.

150. ADD $610.73, $742.19, $9171.693, and $42.93.

151. Add $734.36, $1729.39, $917.16, and $682.39.

152. Add $378.614, $71.94, $1934.62, and $618.25.

153. Add $67.91, $842.60, $7953.428, and $971.41.

154. Add $719.68, $462.06, $5194.62, and $71.94.

155. Add $718.94, $268.791, $1548.691, and $4.719.

156. Add $7894.62, $2689.73, $160.74, and $462.008.

157. $647.12 + $793.51 + $716.482 + $423.600 = what?

158. $592.316 + $1754.98 + $346.718 + $24.008 = what?

159. $786.491 + $157.482 + $7481.891 + $624.107 = what?

160. $867.135 + $571.275 + $4817.914 + $619.207 = what?

161. $752.62 + $419.109 + $7819.752 + $964.283 = what?

162. $1001.09 + $493.527 + $8193.763 + $628.491 = what?

163. $680.508 + $367.253 + $34.367 + $6067.006 = what?

164. What is the sum of $1975.146, $187.56, $394.61, and $61.06?

165. What is the sum of $1864.12, $764.28, $642.379, and $346.79?

166. What is the sum of $1906.134, $679.81, $243.78, and $346.791?

167. What is the sum of $173.682, $1472.86, $429.713, and $495.186?

168. What is the sum of $7196.284, $715.986, $425.75, and $856.09?

169. What is the sum of $6917.842, $615.852, $246.57, and $869.571?

170. A man paid $4000 for a house, $16791 for a farm, and $1752.62 for stock and tools; how much did he pay for all?

171. A car company gained $11562 one year, the second year they gained $15649, and the third year they gained $17519; how much did they gain in all?

172. A man had $1671.95, and sold his house for $4361.275, and his farm for $14172.74; how much had he then?

173. A man sold a horse for $617.125, 6 cows for $1341.175, and 56 sheep for $281.745; how much did he receive altogether?

174. A man paid $1.67 for sugar, $2.33 for coffee, $7.55 for a barrel of flour, $3.13 for tea, and 62 cents for butter; how much did he pay for all?

175. A man sold his crop of corn for $971.46, his wheat for $817.32, and his rye for $514.92; how much did he get for all?

176. A man invested $1000 in business one year, the second year he invested $1500, and the third year he invested $506.523. During the first year he gained $426, during the second year he gained $741, and during the third year he gained $1400; how much was he worth at the end of the third year?

177. A man sold a ton of hay for $16.75, a wagon for $47.26, and a carriage for $113.64; how much did he receive for all?

178. A boy paid $6.17 for a pair of pantaloons, $3.34 for a vest, and $10.75 for a coat; how much did he pay for all?

179. A man earned $63.75 in one month, $83.42 in a second, and $91.75 in a third; how much did he earn in all?

180. A man bought three carriages—one for $211.50, another for $157.65, and the third for $319.75; how much did he pay for the three?

181. A man sold six houses, for $1090, $1875, $940, $2750, $1645, and $1500, respectively; how much did he get in all?

182. A man gained $313 by the sale of his house, and $1416.50 by the sale of his farm; how much did he gain altogether?

183. Bought a store and dwelling for $2650, store fixtures for $213, and merchandise for $4695; how much did all cost?

184. Bought a barrel of flour for $7.75, a book for $.90, and a knife for $1.12; what was the whole cost?

SUBTRACTION.

185. From $17504.03 take $10986.67.

186. From $190106.52 take $10941.63.

187. From $10000 take $9157.26.

188. From $27491.56 take $18984.94.

189. From $19840.75 take $11786.47.

190. From $98140 take $89360.95.

191. From $1000.01 take $987.54.

192. $10756.24 – $9759.86 = how many?

193. $71865.42 – $68794.89 = how many?

194. $614.06 – $598.66 = how many?

195. $9140.04 – $8149.65 = how many?

196. $17100 – $16918.75 = how many?

197. $10100.25 – $9842.75 = how many?

198. $10642 – $10379.71 = how many?

199. $98402.20 – $80614.86 = how many?

200. $110742.60 – $86491.75 = how many?

201. $2110.25 – $1290.40 = how many?

202. $1760.65 – $125.05 = how many?

203. $1175.17 – $103.99 = how many?

204. $25000.01 – $999.99 = how many?

205. $90000 – $763.80 = how many?

206. Sold a horse for $891.75, and by doing so gained $341.50; what did the horse cost?

207. Mr. Smith owes $50641.91, and his debtors owe him $75000; how much more is owing to him than he owes?

208. A mill worth $300659 is insured for $218496; how much would be lost if it were burned down?

209. Six horses cost $2531, and were afterwards sold for $1948; how much was lost?

210. A man paid $14068 for a farm, and sold it at a loss of $3498; how much did he receive?

211. A man bought 10 horses for $3421, 20 cows for $1498, and 80 pigs for $159, and then sold them all for $6750; how much did he gain?

MULTIPLICATION.

212. MULTIPLY $672 by 19; $2115.05 by 12.

213. Multiply $714.91 by 15; $853.09 by 25.

214. Multiply $10940.65 by 9; $1760.40 by 75.

215. Multiply $987.56 by 28; $811.11 by 55.

216. Multiply $1875.06 by 36; $2756 by 32.

217. Multiply $6142.009 by 73; $1025.25 by 62.

218. Multiply $16482 by 104; $1246.031 by 22.

219. Multiply $197.56 by 85; $732.575 by 121.

220. Multiply $7354.80 by 10; $8649.19 by 1000.

221. Multiply $17482 by 236; $9384.005 by 105.

222. Multiply $114.02 by 97; $3456.19 by 44.

223. Multiply $1329.76 by 73; $555.005 by 33.

224. Multiply $3215.84 by 49; $1932.125 by 99.

225. $763 × 91 = how much? $114.10 × 75 = how much?

226. $1842.65 × 38 = how much? $73.05 × 15 = how much?

227. $1876.95 × 47 = how much? $9.175 × 100 = how much?

228. $834759 × 58 = how much? $.005 × 10000 = how much?

229. $8.96 × 142 = how much? $29.155 × 270 = how much?

230. $1736 × 61 = how much? $100.10 × 19 = how much?

231. $1894.50 × 79 = how much? $23.06 × 35 = how much?

232. $9142.68 × 86 = how much? $12.125 × 11 = how much?

233. $198716.50 × 58 = how much? $.009 × 101 = how much?

234. $918.75 × 191 = how much? $19.50 × 17 = how much?

235. $816.47 × 347 = how much? $23.03 × 20 = how much?

236. $914.35 × 810 = how much? $.195 × 150 = how much?

237. How much will 438 barrels of flour cost, at $7.55 a barrel?

238. What is the cost of 1984 yards of rope, at $.03 a yard?

239. What is the cost of 1216 bushels of wheat, at $.93 a bushel?

240. Find the cost of 217 tons of hay, at $18.26 a ton.

241. Find the cost of 211 pounds of honey, at 25 cents a pound.

DIVISION.

242. DIVIDE $2442.44 by 35; $1444.60 by 25.

243. Divide $3053.05 by 45; $738.50 by 100.

244. Divide $2702.70 by 55; $1824.90 by 30.

245. Divide $207.90 by 99; $963.60 by 24.

246. Divide $3118.50 by 78; $2400.15 by 15.

247. Divide $10395 by 105; $95566 by 142.

248. Divide $12212.20 by 143; $12852.68 by 17.

249. Divide $15265.25 by 135; $24981.96 by 38.

250. Divide $1627.92 by 153; $312931.92 by 476.

251. Divide $258.40 by 19; $14689.22 by 14.

252. Divide $180.88 by 133; $830996.29 by 127.

253. Divide $323.17 by 17; $64608 by 673.

254. Divide $504 by 56; $526959.88 by 697.

255. $1755.60 ÷ 88 = how many? $45.60 ÷ 57 = how many?

256. $2194.50 ÷ 133 = how many? $532.98 ÷ 54 = how many?

257. $1580040 ÷ 63 = how many? $377.28 ÷ 48 = how many?

258. $693 ÷ 33 = how many? $702.75 ÷ 75 = how many?

259. $1155.00 ÷ 77 = how many? $34.905 ÷ 65 = how many?

260. $219.45 ÷ 95 = how many? $548.10 ÷ 87 = how many?

261. $483.23 ÷ 23 = how many? $294.95 ÷ 85 = how many?

262. $567.00 ÷ 270 = how many? $643.20 ÷ 96 = how many?

263. A farmer bought 25 cows at $37.75 apiece, and a number of others at $25 apiece; how many cows in the second lot, if the whole cost was $4668.75?

264. A man sold a wagon for $87.25, and received in payment 4 tons of coal at $5.25 a ton, and the balance in sugar at $.125 a pound; how much sugar did he receive?

265. Bought 150 bushels of potatoes at the rate of 12 bushels for $10.50, and sold them at the rate of 15 bushels for $9.375; how much was my whole loss?

266. If 278 bales of dry goods cost $4378.50, what will be the cost of one bale?

267. If the salaries of 2010 teachers amount to $1055752.50, what is the average salary of each?

268. $13.12 ÷ 41 = how many?

269. How many barrels of flour, at $8 per barrel, can be bought for $1007, and how much money would be left?

270. A merchant paid $20.25 for some boxes of fruit; if the boxes were $.25 apiece, how many boxes did he buy?

271. How many gallons of cider, at 22 cents a gallon, can be purchased for $27.72?

272. How many cows, at $27 apiece, can be bought for $5339, and how much money would be left after the purchase?

273. A man sold 16 tons of hay, at $17.50 a ton; how many barrels of flour, at $7 a barrel, can he buy with the money?

274. How many quarts of milk, at 6 cents a quart, should I give for 24 pounds of sugar, at $.10 a pound?

275. How many horses, at $175 apiece, can be bought for $1050?

276. How many houses, worth $2715 apiece, must I sell in order to get $24435?

277. How many tons of iron rails can be bought for $9165, at $13 a ton?

278. If a company divided $247000 equally among 61750 stock-holders, how much would each one get?

279. If a grammar cost $.64, how many grammars can be bought for $10.24?

280. A man paid $7.29 for oranges; if the oranges were $.27 a dozen, how many did he buy?

281. How many oysters, at $.55 a hundred, can I buy for $2.75?

282. How many acres of land, at $25.50 per acre, must be given for 225 acres, at $86.50 per acre?

283. A merchant bought 550 barrels of flour, at $6.25 a barrel, and another lot, at $4.50 a barrel; how many barrels did he buy in all, if the whole cost was $6173.50?

284. If 396 pounds of coffee cost $89.496, how much was the coffee worth per pound?

REVIEW PROBLEMS.

ADD—

(*285.*)	(*286.*)	(*287.*)	(*288.*)
$756.10	$61.78	$1756.25	$758.91
841.75	918.52	643.79	91.75
91.52	64.85	92.15	65.86
8.17	78.53	7.61	184.65
109.85	814.27	75.48	97.58
31.76	48.65	641.97	81.64
171.48	7.82	81.75	7.59
69.54	18.75	58.96	519.27
3.79	95.76	496.57	98.45
258.46	185.37	68.94	816.23
85.97	57.48	71.26	65.37
91.82	83.64	141.38	137.45

289. $791.55 + $81.45 + $612.90 ÷ (9 × 5) = what?

290. $642.70 − ($72.95 × 6) = what?

291. ($97.12 × 217) − $1514.96 = what?

292. ($9127.85 + $712.15) ÷ $.25 = what?

293. ($62.50 + $3125) ÷ $1.25 = what?

294. ($1346.70 + $2012.01) ÷ $6.70 = what?

295. $69.30 × 216 ÷ 99 = what?

296. $176.50 × 2541 ÷ 231 = what?

297. ($614.26 × 1331) − ($148.50 ÷ 11) = what?

298. ($732.80 × 814) − $579841.56 = what?

299. ($17.91 + $41.02) × 1694 ÷ 11 = what?

300. ($169.40 ÷ $1.10) × $612.50 = what?

301. ($12000 − $6842.27) × 75 = what?

302. With how many dollars can a man buy 20 houses, at $1950 apiece, and have a remainder of $614.50?

303. How much money will be required to buy 17 horses, at $215 apiece, and 61 cows, at $77 apiece, and have $486 left?

304. How much will John have left out of a $500 note after buying 57 barrels of corn, at $3.15 a barrel?

305. What is the difference in value between 17 double eagles and $298.50?

306. What is the difference between the cost of 63 pounds of coffee, at 31 cents a pound, and 21 pounds of tea, at $.93 a pound?

307. How many eagles must be given for 240 sheep, at $15 a pair?

308. What will 731 tons of hay cost, at $17.55 a ton?

309. A man sold 816 houses, at $930 apiece; how many horses, at $316.20 apiece, can he buy with the money he receives for the houses?

310. A man had $671.50, and sold 117 bushels of wheat, at $.93 a bushel; how much had he then?

311. A man bought 87 sheep, at $8 apiece. Six of the sheep died, and he sold the remainder so as to gain $33 on the whole; how much did he get apiece for the sheep?

312. A man had $1175, and paid $514 for a horse and carriage, and $11 for harness; if the remainder were all in half eagles, how many would he have?

313. What is the cost of 1296 eggs at $.43 a dozen?

314. What will 514 pigs cost, at $2.50 apiece?

315. How many houses, at $1400 each, can be bought for $27500, and how much money will be left?

316. The product is $9808.40, the multiplicand is $79.10; what is the multiplier?

317. A man had $1651, and lost so much that he had only $946.25 left; how much did he lose?

318. A man sold 7 horses which cost him $1743 for $2100; how much did he gain on each?

319. What is the cost of 211 sheep, at $2.75 apiece?

320. How much change will a man get out of a $5 bill, after buying 10 pounds of sugar, at 8 cents a pound, and 25 pounds of flour, at 6 cents a pound?

321. What will 918 tons of coal cost, at $6.50 a ton?

322. How many yards of carpet, at $4.25 a yard, can I buy for $238?

323. How many bushels of potatoes, at $1.15 a bushel, should I give for 23 bushels of wheat, at $.95 a bushel?

324. A man bought 80 sheep for $400. Twenty of them died, and he sold the rest at such a price as to gain $140 on the whole; how much did he charge apiece for them?

325. A man earns $1500 in a year of 365 days, and pays away $2.50 a day; how much will he save in a year?

326. Subtract $1750 from the product of $84.50 and 36.

327. $611.45 + $732.50 − $912.24 ÷ 9 = what?

328. $873.50 × 64 + $718.75 × 24 = what?

329. A laborer worked a certain number of days and received $14.40; if he had worked 10 days more he would have received $23.40; what did he get per day, and how many days did he work?

330. A man bought 600 barrels of flour, at $6.50 a barrel, and sold 200 barrels, at $5.50 per barrel, and 400 barrels, at $8 per barrel; how much did he gain?

331. How many tons of coal, at $5.75 a ton, can be bought for $115?

332. A man sold 210 bushels of wheat, at $.96 a bushel, and bought hay, at $14.40 a ton. He afterwards sold the hay, at $16 a ton; what did he gain?

333. How many mills in $619.02?

334. How many cents in 123 double eagles?

335. A man having a lot of fox-skins sold all but six of them, and received $15.21; if he had sold them all he would have received $22.23. How many skins did he have at first, and how much did he receive for each skin that he sold?

336. A and B together own $98.64. If they buy sugar at 9 cents per pound, B can buy 98 pounds more than A. How many pounds can A buy?

337. The cost of a quantity of coffee at 35 cents per pound, and tea at 95 cents per pound, is $38.60, the coffee costing 60 cents more than the tea. How many pounds of coffee are in the quantity? How many pounds of tea?

338. For $23.04 I can buy 8 pieces of muslin, worth 9 cents a yard. How many yards are there in each piece?

339. If I sell 23 barrels of flour for $149.50, I lose 5 cents on the cost of each barrel. What did it cost me per barrel?

340. A earns $32.40 for 18 days' work, and B earns $30.40 for 16 days' work. In how many days will A earn as much as B earns in 18 days?

341. A father bequeathed $16000 as follows: $3000 to his oldest son, $2500 to his second son, and the remainder equally among five other children. What did each of the five receive?

342. If a car runs 600 miles in 24 hours, in how many hours will it run 175 miles, at the same rate of speed?

343. What is the cost of 3600 bricks, at $7 per thousand?

344. How much must be paid for 15000 feet of boards, at $36 a thousand?

345. A bought a quantity of tea for $34.56, and B the same quantity of inferior tea, costing 10 cents less per pound than A's, for $30.96. If A sells his tea at $1 a pound, does he gain or lose, and how much?

346. A man sold 304 eggs, at 2 cents and 5 mills apiece; how many pounds of prunellos, at 2 dimes a pound, can be bought with the money?

347. Multiply $408.24 by 65, and divide the product by 117.

348. What number of dollars multiplied by 450 gives $79200?

349. What number of dollars divided by 617 gives $239 for a quotient and $523 for a remainder?

350. What number of dollars taken from $19417 leaves $7428?

351. How many pounds of butter, at $.37 per pound, should be given for 35 pounds of tea at $1.11 a pound?

352. A man bought a farm for $13500, and sold it for $15000; how many cows, at $75 apiece, could he buy with what he gained?

COMMON FRACTIONS.

WRITE in figures—

1. Two-sevenths, four-fifths, seven-ninths.

2. One-eighth, three-tenths, four-sevenths.

3. Five-sixths, four-sevenths, six-elevenths.

4. Eight-thirteenths, twenty-five thirtieths.

5. Sixteen forty-seconds, seven sixty-fourths.

6. Fifty-five eightieths, sixty-one hundredths.

7. Two-hundred thousandths.

8. Seventy-six hundred-thousandths.

9. One ninety-seventh, three ninety-ninths.

10. Eighteen forty-fifths, two twenty-firsts.

11. Sixty-nine seven-hundredths.

12. Ninety-four four hundred and seventeenths.

13. Seventy-three nine hundred and twentieths.

14. One hundred and seventy-four thousand three hundred and sixty thousandths.

15. One hundred and fifty-three thousand six hundred and six millionths.

Read or write in words the following:

16. $\frac{2}{7}$, $\frac{4}{5}$, $\frac{5}{12}$, $\frac{19}{24}$, $\frac{200}{500}$.

17. $\frac{3}{5}$, $\frac{1}{11}$, $\frac{2}{14}$, $\frac{11}{15}$, $\frac{18}{27}$.

18. $\frac{6}{8}$, $\frac{7}{9}$, $\frac{10}{13}$, $\frac{9}{16}$, $\frac{28}{19}$.

19. $\frac{5}{14}$, $\frac{8}{11}$, $\frac{18}{28}$, $\frac{121}{824}$, $\frac{117}{219}$.

20. $\frac{21}{45}$, $\frac{23}{97}$, $\frac{31}{119}$, $\frac{64}{517}$, $\frac{82}{117}$.

21. $\frac{41}{710}$, $\frac{21}{180}$, $\frac{11}{42}$, $\frac{12}{14}$, $\frac{140}{25}$.

22. $\frac{2}{19}$, $\frac{21}{104}$, $\frac{11}{209}$, $\frac{181}{28}$, $\frac{75}{100}$.

23. $\frac{614}{917}$, $\frac{761}{4109}$, $\frac{112}{21097}$, $\frac{300}{900}$, $\frac{625}{1000}$.

24. $\frac{1}{1000}$, $\frac{204}{265000}$, $\frac{1}{1000000}$, $\frac{2}{1100}$, $\frac{5}{2700}$.

25. $\frac{263}{256}$, $\frac{1920}{2000}$, $\frac{179}{1121}$, $\frac{863}{906}$, $\frac{1728}{144}$.

26. $\frac{109}{1420}$, $\frac{2250}{1525}$, $\frac{1816}{89}$, $\frac{75}{250}$, $\frac{121}{1760}$.

27. $\frac{424}{555}$, $\frac{760}{999}$, $\frac{2120}{3000}$, $\frac{93}{97}$, $\frac{360}{3600}$.

REDUCTION.

CASE I.

28. CHANGE $\frac{26}{44}$ to its lowest terms.
29. Change $\frac{144}{256}$ to its lowest terms.
30. Change $\frac{201}{750}$ to its lowest terms.
31. Change $\frac{72}{216}$ to its lowest terms.
32. Change $\frac{170}{6800}$ to its lowest terms.
33. Change $\frac{640}{144}$ to its lowest terms.
34. What fraction of a dollar is 50 cents?
35. Ten cents is what part of an eagle?
36. What part of a dime is 150 mills?
37. Thirty-five cents is what part of a dollar?
38. What part of a dollar is 25 dimes?
39. $1.25 is what part of an eagle?
40. What fraction of a dime is 50 cents?
41. $.75 is what part of a dollar?

CASE II.

42. Change $\frac{3}{11}$ to 77ths; $\frac{4}{12}$ to 48ths.
43. Change $\frac{1}{2}$ to 8ths; $\frac{5}{9}$ to 27ths.
44. Change $\frac{1}{3}$ to 24ths; $\frac{2}{3}$ to 36ths.
45. Change $\frac{3}{7}$ to 21sts; $\frac{4}{5}$ to 80ths.
46. Change $\frac{11}{12}$ to 72ds; $\frac{9}{11}$ to 66ths.
47. Change $\frac{1}{2}$ to 100ths; $\frac{8}{18}$ to 52ds.
48. Change $\frac{3}{9}$ to 45ths; $\frac{12}{16}$ to 96ths.
49. Change $\frac{8}{15}$ to 60ths; $\frac{10}{17}$ to 68ths.
50. Change $\frac{19}{27}$ to 81sts; $\frac{15}{30}$ to 90ths.
51. Change $\frac{121}{405}$ to 2835ths; $\frac{111}{200}$ to 1600ths.
52. Change $\frac{6}{7}$ to 42ds; $\frac{90}{120}$ to 360ths.
53. Change $\frac{2}{11}$ to 121sts; $\frac{14}{19}$ to 133ds.
54. Change $\frac{14}{16}$ to 144ths; $\frac{17}{22}$ to 88ths.
55. Change $\frac{11}{17}$ to 85ths; $\frac{19}{24}$ to 120ths.
56. Change $\frac{5}{13}$ to 78ths; $\frac{81}{61}$ to 305ths.
57. Change $\frac{2}{25}$ to 200ths; $\frac{29}{31}$ to 155ths.
58. Change $\frac{31}{45}$ to 900ths; $\frac{115}{230}$ to 1610ths.

CASE III.

59. In 2 how many thirds? In 3? In 4?
60. In 16 how many 9ths? In 20? In 30?
61. In 13 how many 11ths? In 15? In 21?
62. In 18 how many 7ths? In 25? In 37?
63. In $7\frac{1}{2}$ how many halves? In $9\frac{1}{2}$?
64. In $8\frac{1}{3}$ how many 3ds? In $12\frac{1}{3}$? In $21\frac{2}{3}$?
65. In $7\frac{4}{11}$ how many 11ths? In $15\frac{7}{11}$? In $30\frac{8}{11}$?
66. In $8\frac{7}{9}$ how many 9ths? In $11\frac{8}{9}$? In $52\frac{8}{9}$?
67. In $6\frac{11}{15}$ how many 15ths? In $9\frac{9}{15}$? In $30\frac{14}{15}$?
68. In $7\frac{21}{33}$ how many 33ds? In $17\frac{10}{33}$? In $19\frac{24}{33}$?
69. Reduce $8\frac{6}{27}$ to 27ths. Change $91\frac{2}{7}$ to 7ths.
70. Change $23\frac{5}{17}$ to 17ths. Change $9\frac{7}{8}$ to 8ths.
71. How many 3ds in $16\frac{2}{3}$? In $19\frac{1}{3}$?
72. How many 14ths in $12\frac{2}{14}$? In $35\frac{11}{14}$?
73. How many 91sts in $141\frac{27}{91}$? In $200\frac{80}{91}$?
74. How many 75ths in $16\frac{50}{75}$? In $75\frac{72}{75}$?

CASE IV.

75. Change $\frac{27}{8}$ to a whole number.
76. Change $\frac{105}{7}$ to a whole number.
77. Change $\frac{144}{18}$ to a whole number.
78. Change $\frac{177}{16}$ to a mixed number.
79. Change $\frac{185}{12}$ to a mixed number.
80. Change $\frac{214}{17}$ to a mixed number.
81. Change $\frac{116}{9}$ to a mixed number.
82. Change $\frac{1050}{68}$ to a mixed number.
83. Change $\frac{788}{24}$ to a mixed number.
84. Change $\frac{11412}{87}$ to a mixed number.
85. In $\frac{71}{2}$ dollars, how many whole ones?
86. In $\frac{63}{8}$ of a gallon, how many gallons?
87. In $\frac{98}{14}$ of a bushel, how many bushels?
88. In $\frac{105}{15}$ of a quart, how many quarts?
89. In $\frac{72}{4}$ of a yard, how many yards?
90. How many inches in $\frac{27}{4}$ of an inch?

CASE V.

91. How many 84ths in $\frac{6}{7}$; in $\frac{11}{21}$; in $\frac{25}{42}$; in $\frac{23}{14}$?

92. How many 210ths in $\frac{7}{8}$; in $\frac{3}{7}$; in $\frac{60}{105}$; in $\frac{29}{80}$?

93. How many 286ths in $\frac{3}{2}$; in $\frac{11}{13}$; in $\frac{13}{11}$; in $\frac{17}{22}$?

94. How many 230ths in $\frac{11}{10}$; in $\frac{19}{23}$; in $\frac{4}{5}$; in $\frac{27}{115}$?

95. What is the common denominator of $\frac{3}{4}$, $\frac{5}{7}$, and $\frac{6}{9}$?

96. What is the common denominator of $\frac{2}{13}$, $\frac{6}{15}$, and $\frac{7}{10}$?

97. What is the common denominator of $\frac{1}{17}$, $\frac{1}{18}$, and $\frac{1}{19}$?

98. What is the common denominator of $\frac{1}{11}$, $\frac{1}{12}$, and $\frac{1}{9}$?

99. Change $\frac{1}{7}$, $\frac{3}{9}$, and $\frac{5}{12}$ to a common denominator.

100. Change $\frac{3}{11}$, $\frac{4}{21}$, and $\frac{1}{3}$ to a common denominator.

101. Change $\frac{17}{19}$ and $\frac{23}{25}$ to a common denominator.

102. Change $\frac{14}{19}$ and $\frac{16}{30}$ to a common denominator.

103. Change $\frac{19}{17}$ and $\frac{4}{5}$ to a common denominator.

104. Change $\frac{11}{12}$, $\frac{1}{7}$, and $\frac{4}{5}$ to a common denominator.

105. What is the common denominator of $\frac{5}{6}$, $\frac{1}{2}$, and $\frac{8}{9}$?

106. What is the common denominator of $\frac{3}{7}$, $\frac{2}{5}$, and $\frac{4}{11}$?

107. What is the common denominator of $\frac{17}{21}$ and $\frac{101}{194}$?

108. What is the common denominator of $\frac{14}{35}$ and $\frac{52}{311}$?

109. What is the common denominator of $\frac{92}{105}$ and $\frac{17}{81}$?

110. What is the common denominator of $\frac{3}{5}$, $\frac{6}{19}$, and $\frac{20}{41}$?

111. How many 27ths in $\frac{2}{3}$; in $\frac{5}{9}$; in $\frac{6}{18}$?

112. How many 36ths in $\frac{1}{2}$; in $\frac{3}{4}$; in $\frac{11}{18}$?

113. How many 105ths in $\frac{4}{7}$; in $\frac{23}{35}$; in $\frac{4}{5}$?

114. How many 144ths in $\frac{3}{16}$; in $\frac{19}{36}$; in $\frac{15}{24}$; in $\frac{17}{36}$?

115. Change $\frac{12}{17}$, $\frac{23}{29}$, and $\frac{4}{5}$ to a common denominator.

116. How many 117ths in $\frac{7}{9}$; in $\frac{2}{3}$; in $\frac{7}{18}$?

117. How many 297ths in $\frac{58}{99}$; in $\frac{4}{11}$; in $\frac{5}{9}$?

118. How many 1008ths in $\frac{15}{16}$; in $\frac{5}{7}$; in $\frac{11}{18}$; in $\frac{17}{36}$?

119. Change $\frac{4}{11}$ and $\frac{6}{7}$ to a common denominator.

120. How many 64ths in $\frac{7}{8}$, $\frac{21}{32}$, and $\frac{3}{16}$?

121. How many 1728ths in $\frac{11}{12}$, $\frac{101}{144}$, $\frac{970}{288}$?

122. How many 756ths in $\frac{18}{63}$, $\frac{42}{126}$, $\frac{121}{252}$?

123. Change $\frac{18}{37}$, $\frac{9}{45}$, $\frac{27}{61}$ to a common denominator.

124. Change $\frac{19}{88}$, $\frac{38}{76}$, $\frac{76}{152}$ to a common denominator.

ADDITION.

125. ADD $\frac{1}{2}\frac{7}{8}$, $\frac{1}{1}\frac{4}{5}$, $\frac{1}{1}\frac{9}{1}$, and $\frac{2}{8}$; $\frac{1}{4}\frac{3}{8}$, $\frac{6}{7}$, $\frac{6}{2}$, and $\frac{1}{9}$.

126. Add $\frac{6}{7}$, $\frac{4}{5}$, $\frac{2}{1}\frac{0}{7}$, and $\frac{2}{3}\frac{8}{1}$; $\frac{8}{5}$, $\frac{7}{8}$, $\frac{5}{6}$, and $\frac{8}{2}\frac{}{5}$.

127. Add $\frac{7}{2}$, $\frac{1}{6}\frac{4}{}$, $\frac{7}{9}$, and $\frac{8}{1}\frac{}{9}$; $\frac{5}{1}\frac{}{1}$, $\frac{1}{2}\frac{1}{2}$, $\frac{1}{4}\frac{3}{0}$, and $\frac{8}{1}\frac{}{0}$.

128. Add $\frac{8}{4}$, $\frac{8}{4}\frac{4}{5}$, $\frac{1}{5}\frac{1}{}$, and $\frac{9}{2}$; $\frac{1}{8}\frac{2}{}$, $\frac{2}{2}\frac{5}{}$, $\frac{1}{6}\frac{7}{}$, and $\frac{1}{4}\frac{0}{}$.

129. Add $\frac{7}{9}$, $\frac{1}{1}\frac{1}{2}$, $\frac{1}{1}\frac{4}{8}$, and $\frac{3}{2}$; $\frac{8}{5}$, $\frac{9}{6}$, $\frac{9}{7}$, and $\frac{9}{8}$.

130. Add $\frac{1}{8}\frac{4}{}$, $\frac{1}{8}\frac{9}{}$, $\frac{1}{6}\frac{4}{}$, and $\frac{5}{2}$; $\frac{1}{1}\frac{4}{0}$, $\frac{8}{1}\frac{}{2}$, $\frac{6}{1}\frac{}{6}$, and $\frac{1}{9}\frac{8}{}$.

131. Add $2\frac{3}{4}$, $5\frac{1}{6}$, and $3\frac{1}{8}$; $5\frac{1}{1}\frac{0}{4}$, $10\frac{1}{8}$, $9\frac{4}{5}$, and $8\frac{5}{8}$.

132. What is the sum of $6\frac{4}{5}$, $17\frac{3}{1}\frac{}{1}$, and $12\frac{4}{7}$?

133. What is the sum of $7\frac{3}{4}$, $11\frac{2}{4}$, and $5\frac{6}{7}$?

134. What is the sum of $\frac{6}{1}\frac{}{1}$, $\frac{2}{7}\frac{1}{}$, and $\frac{3}{1}\frac{1}{9}$?

135. What is the sum of $\frac{7}{1}\frac{}{8}$, $\frac{5}{6}$, and $\frac{2}{7}\frac{3}{}$?

136. What is the sum of $\frac{1}{1}\frac{4}{5}$, $\frac{6}{7}$, and $\frac{1}{4}\frac{7}{}$?

137. What is the sum of $\frac{7}{8}$, $\frac{1}{2}\frac{5}{8}$, and $\frac{4}{1}\frac{}{1}$?

138. A man paid $\$1\frac{3}{4}$ for some sugar, $\$2\frac{1}{8}$ for two chickens, and $\$3\frac{4}{7}$ for some tea; how much did he pay in all?

139. Henry sold one piece of cloth containing $16\frac{3}{8}$ yards, another containing $14\frac{3}{5}$ yards, and a third containing $17\frac{5}{8}$ yards; how many yards did he sell altogether?

140. $17\frac{1}{2}$ gallons + $21\frac{3}{4}$ gallons + $15\frac{5}{8}$ gallons = how many gallons?

141. A man sold 4 rolls of paper; the first contained $17\frac{1}{2}$ yards, the second $21\frac{1}{4}$ yards, the third $14\frac{1}{8}$ yards, and the fourth $14\frac{2}{6}$ yards; how many yards were there in all?

142. $\$12\frac{1}{2}$ + $\$15\frac{7}{8}$ + $\$10\frac{3}{4}$ + $\$6\frac{4}{5}$ = how much?

143. A man has 4 casks. The first contains $16\frac{1}{2}$ gallons, the second $21\frac{4}{5}$, the third $56\frac{5}{7}$, the fourth 39; how many gallons will all hold?

144. John paid $\$21\frac{5}{8}$ for a boat, $\$1\frac{1}{2}$ for a pair of oars, and $\$1\frac{1}{4}$ for some fishing-lines; how much did he pay altogether?

145. A merchant sold $182\frac{1}{2}$ pounds of sugar, $12\frac{3}{4}$ pounds of cheese, and $37\frac{1}{8}$ pounds of tea; how many pounds did he sell in all?

146. $325\frac{3}{7}$ acres + $119\frac{1}{4}$ acres + $13\frac{3}{5}$ acres = how many acres?

147. $\$110\frac{1}{4}$ + $\$312\frac{1}{8}$ + $\$75\frac{3}{1}\frac{}{0}$ = how many dollars?

SUBTRACTION.

148. SUBTRACT $7\frac{5}{6}$ from $8\frac{1}{4}$; $9\frac{1}{7}$ from $11\frac{3}{4}$.

149. $76\frac{5}{11} + 6\frac{3}{5} - 71\frac{4}{9}$ = how much?

150. From $72\frac{3}{5}$ take $68\frac{6}{11}$; from $93\frac{2}{11}$ take $11\frac{1}{8}$.

151. Take $16\frac{5}{7}$ from $28\frac{3}{10}$; $13\frac{3}{9}$ from $15\frac{1}{6}$.

152. Subtract $18\frac{4}{5}$ from $42\frac{5}{6}$; $22\frac{1}{2}$ from $31\frac{1}{4}$.

153. $94\frac{2}{7} - 80\frac{4}{5}$ = how much? $19\frac{1}{4} - 17\frac{1}{3}$ = how much?

154. From $21\frac{3}{8}$ take $15\frac{6}{7}$; $37\frac{3}{8} - 25\frac{1}{2}$ = how much?

155. Take $19\frac{3}{8}$ from $19\frac{3}{4}$; $87\frac{1}{3}$ from 100.

156. Subtract $20\frac{4}{15}$ from $31\frac{3}{17}$; $33\frac{1}{3}$ from $66\frac{1}{5}$.

157. $81\frac{2}{5} - 56\frac{3}{4}$ = how much? $74\frac{1}{5} - 13\frac{7}{8}$ = how much?

158. $70\frac{4}{9} - 45\frac{6}{7}$ = how much? $29\frac{3}{4} - 18\frac{3}{16}$ = how much?

159. From $27\frac{1}{2}\frac{6}{8}$ take $19\frac{1}{2}$; $11\frac{2}{7} - 5\frac{1}{2}$ = how much?

160. Take $101\frac{4}{5}$ from $203\frac{3}{4}$; $130\frac{1}{11}$ from $145\frac{1}{12}$.

161. Subtract $71\frac{3}{5}$ from 80; $99\frac{5}{8}$ from $103\frac{3}{16}$.

162. $87 - 68\frac{3}{11}$ = how much? $150\frac{2}{9} - 36\frac{3}{14}$ = how much?

163. $92\frac{5}{6} - 48\frac{7}{8}$ = how much? $111\frac{1}{12} - 101\frac{2}{15}$ = how much?

164. A man bought 6 sheep for $\$18\frac{4}{5}$, a cow for $\$62\frac{3}{4}$, and a ton of hay for $\$17\frac{1}{2}$; how much will he have left out of \$125?

165. $71\frac{1}{4}$ gallons $- 21\frac{3}{7}$ gallons = how many gallons?

166. $62\frac{1}{2}$ yards $+ 17\frac{3}{5}$ yards $- 48\frac{4}{7}$ yards = how many yards?

CANCELLATION.

167. $42 \times 72 \times 96 \div 12 \times 21 \times 9$ = how many?

168. What are the factors of 6, 8, 14, 16, 20, 36, 42?

169. What are the factors of 16, 32, 48, 54, 60, 72?

170. What are the factors of 96, 105, 108, 120, 144?

171. What are the prime factors of 18, 21, 24, 30, 36?

172. What are the prime factors of 40, 110, 273, 935?

173. What are the prime factors of 114, 80, 84, 190?

174. Which of the following numbers are composite, and which are prime: 13, 16, 18, 21, 23, 25, 29, 36, 37, 44, 48, 49?

175. What prime numbers multiplied together will produce 25, 66, 99, 172, 200, 136?

MULTIPLICATION.

176. How many pounds in $7\frac{3}{4}$ tons, if 1 ton = 2240 pounds?

177. How many yards in $6\frac{21}{22}$ miles, if 1 mile = 1760 yards?

178. What is the cost of $\frac{17}{32}$ of a mile of rope, at \$.02 a yard?

179. What is the cost of $16\frac{3}{4}$ yards of cloth, at $\$3\frac{3}{5}$ a yard?

180. What is the cost of $17\frac{1}{2}$ tons of hay, at $\$16\frac{3}{4}$ a ton?

181. What will 16 men earn in a day, if 1 man can earn $\$1\frac{1}{5}$?

182. How much must I pay for 16 barrels of flour, at $\$7\frac{7}{8}$ per barrel?

183. What is the cost of $20\frac{1}{8}$ cords of oak wood, at the rate of \$9.25 per cord?

184. What is the cost of $37\frac{1}{2}$ barrels of fish, at the rate of \$14.375 per barrel?

185. What is the cost of $300\frac{1}{4}$ bushels of oats, at the rate of $62\frac{1}{2}$ cents per bushel?

186. What is the cost of $25\frac{1}{2}$ pounds of mutton, at $17\frac{1}{2}$ cents a pound?

187. What is the cost of $19\frac{3}{5}$ pounds of tea, at \$.93 a pound?

188. If a man earns $\$1\frac{1}{5}$ a day, how much will he earn in 30 days?

189. What is the cost of 36 dozen eggs, at $\$.39\frac{3}{8}$ per dozen?

190. If John earns 93 cents a day, how much will he earn in $22\frac{1}{8}$ days?

191. Multiply $61\frac{4}{5}$ by 16; $29\frac{1}{4} \times 12$ = what?

192. Multiply $83\frac{3}{7}$ by 49; $34\frac{2}{5} \times 52$ = what?

193. Multiply 68 by $41\frac{3}{4}$; $17 \times 39\frac{1}{3}$ = what?

194. Multiply 70 by $10\frac{6}{7}$; $22\frac{8}{17} \times 43$ = what?

195. $61\frac{4}{11}$ inches $\times$ 33 = how many inches?

196. $71\frac{3}{7}$ pounds $\times$ 28 = how many pounds?

197. $16\frac{3}{5}$ yards $\times$ 15 = how many yards?

198. $14\frac{3}{4}$ tons $\times$ $16\frac{1}{2}$ = how many tons?

DIVISION.

199. WHAT number is that which, if multiplied by $4\frac{1}{8}$, will produce $4\frac{1}{18}$?

200. What number is that which, if multiplied by $14\frac{1}{7}$, will produce 14?

201. What number is that which, if multiplied by $9\frac{3}{8}$, will produce $3\frac{3}{7}$?

202. What number is that which, if multiplied by $11\frac{1}{9}$, will produce $9\frac{1}{11}$?

203. Divide $4\frac{2}{3}$ by 6; by 5; by 8; by 18.

204. Divide $6\frac{1}{5}$ by 9; by 11; by 13; by 15.

205. Divide $7\frac{3}{5}$ by 9; by 10; by 14; by 16.

206. Divide $5\frac{1}{4}$ by 7; by 19; by 27.

207. Divide $26\frac{2}{3}$ by 10; by 15; by 25.

208. Divide $18\frac{1}{9}$ by 12; by 14; by 24.

209. Divide $23\frac{4}{5}$ by 6; by 13; by 15.

210. Divide $17\frac{1}{3}$ by $9\frac{1}{3}$; by $8\frac{1}{2}$; by $13\frac{3}{4}$.

211. Divide $\frac{26}{3}$ by $\frac{2}{9}$; by $\frac{2}{10}$; by $\frac{3}{12}$.

212. $\frac{64}{9} \div \frac{8}{3}$ = what? $\frac{17}{23} \div \frac{9}{5}$ = what?

213. $\frac{711}{12} \div \frac{9}{20}$ = what? $\frac{111}{19} \div \frac{21}{17}$ = what?

214. $\frac{6}{11}$ of $\frac{792}{86}$ = what? $\frac{23}{140}$ of $\frac{110}{25}$ = what?

215. $\frac{321}{14} \div \frac{98}{107}$ = what? $\frac{66}{88} \div \frac{12}{11}$ = what?

216. $\frac{14}{75} \div \frac{91}{225}$ = what? $\frac{836}{18} \div \frac{42}{24}$ = what?

217. If a man earns $\$6\frac{1}{3}$ in 4 days, what does he earn in 1 day?

218. Six men can build $14\frac{2}{5}$ yards of wall in 6 days; how many yards can one man build in 1 day?

219. What cost 1 yard of cloth, at $\$16\frac{2}{3}$ for 10 yards?

220. What cost 6 pounds of sugar, at \$.96 for 10 pounds?

221. If a man travels $14\frac{2}{7}$ miles in 5 hours, how far will he go in 11 hours?

222. $\$25\frac{5}{18} \div 15\frac{5}{7}$ = what? $\$10\frac{3}{7} \div 9\frac{1}{3}$ = what?

223. What cost $16\frac{2}{3}$ bushels of wheat, at \$6 for $6\frac{6}{19}$ bushels?

224. What cost 11 pounds of tea, at $\$4\frac{35}{100}$ for 15 pounds?

225. What cost 17 bags of coffee, at $\$74\frac{1}{2}$ for 8 bags?

GREATEST COMMON DIVISOR.

226. WHAT is the greatest common divisor of 78, 104, and 156?

227. What is the greatest common divisor of 144, 1116, 648, and 36?

228. What is the greatest common divisor of 72, 108, and 45?

229. What is the greatest common divisor of 225, 60, and 305?

230. What is the greatest common divisor of 714, 340, 629, and 170?

231. What is the greatest common divisor of 693, 891, and 1089?

232. An agent has three pieces of land to sell, containing 497, 355, and 639 acres respectively. What is the least number of farms, all of equal size, that can be obtained from each?

233. Find the greatest common divisor of 640, 860, and 20.

234. Find the greatest common divisor of 27, 243, 81, and 108.

235. Find the greatest common divisor of 98, 140, and 196.

236. A man has three boards, the first 105 inches long, the second 245 inches long, and the third 385 inches long; what is the least number of pieces of equal length into which they can be cut?

237. Find the greatest common divisor of $6\frac{1}{2}$, $12\frac{1}{2}$, and $18\frac{3}{4}$.

NOTE.—To find the greatest common divisor of fractions or of numbers involving fractions; Change whole or mixed numbers to improper fractions, and all the fractions to their least common denominator; then find the greatest common divisor of the numerators for the numerator, and the greatest common divisor of the denominators for the denominator of the *greatest common divisor* required.

238. Find the greatest common divisor of $7\frac{1}{2}$, $12\frac{5}{8}$, and 15.

239. Change to its lowest terms $\frac{729}{1089}$.

240. Change to its lowest terms $\frac{1188}{1386}$.

241. Change to its lowest terms $\frac{1125}{2250}$.

LEAST COMMON MULTIPLE.

242. FIND the least common multiple of 16, 20, 43, and 56.

243. Find the least common multiple of 7, 11, 22, 49, 36, and 72.

244. Find the least common multiple of 15, 20, 30, 40, 63, and 9.

245. Find the least common multiple of 13, 17, 26, 68, and 16.

246. Find the least common multiple of 12, 14, 42, 60, and 4.

247. Find the least common multiple of 19, 63, 56, 72, and 2.

248. Find the least common multiple of 62, 24, 36, and 124.

249. Find the least common multiple of 34, 25, 85, and 16.

250. Find the least common multiple of 16, 54, 48, and 21.

251. Find the least common multiple of 60, 42, 70, and 10.

252. John can walk a mile in 15 minutes, James in 12 minutes, and Mary in 20 minutes; if they all start together to walk up and down a path 1 mile long, how soon will they come together again at the starting-place?

253. One horse can go a mile in $2\frac{1}{2}$ minutes, another in $3\frac{1}{4}$ minutes, and a third in $2\frac{3}{5}$ minutes; if the three start at once to run around a race-track which is one mile in length, how soon will they come together at the starting-point?

NOTE.—To find the least common multiple of fractions or of numbers involving fractions; change whole or mixed numbers to improper fractions, and all the fractions to their least common denominator; then find the least common multiple of the numerators for the numerator, and the least common multiple of the denominators for the denominator of the *least common multiple* required.

254. What is the least common multiple of $6\frac{1}{4}$, $17\frac{1}{2}$, and $5\frac{5}{7}$?

255. What is the least common multiple of $12\frac{1}{3}$, $8\frac{2}{9}$, and $10\frac{1}{11}$?

256. What is the least whole number that $2\frac{5}{8}$, $8\frac{3}{4}$, $16\frac{2}{3}$, and $31\frac{1}{2}$ will exactly divide?

LEAST COMMON DENOMINATOR.

257. REDUCE $\frac{3}{4}$, $\frac{4}{15}$, $\frac{19}{25}$, and $\frac{7}{12}$ to their least common denominator.

258. Change $\frac{6}{7}$, $\frac{5}{16}$, $\frac{27}{21}$, and $\frac{11}{24}$ to their least common denominator.

259. Change $\frac{6}{8}$, $\frac{7}{12}$, $\frac{5}{9}$, and $\frac{4}{11}$ to their least common denominator.

260. Change $\frac{15}{16}$, $\frac{6}{7}$, and $\frac{13}{56}$ to their least common denominator.

261. Change $\frac{15}{19}$, $\frac{6}{10}$, $\frac{5}{38}$, and $\frac{12}{16}$ to their least common denominator.

262. Change $\frac{3}{7}$, $\frac{5}{11}$, $\frac{2}{21}$, and $\frac{6}{88}$ to their least common denominator.

263. Change $\frac{4}{9}$, $\frac{13}{15}$, $\frac{6}{8}$, and $\frac{4}{11}$ to their least common denominator.

Change the following fractions to their least common denominator, and add them:

264. $\frac{3}{7}$, $\frac{5}{16}$, $\frac{4}{15}$, and $\frac{19}{21}$; $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$, and $\frac{7}{9}$.

265. $\frac{5}{11}$, $\frac{12}{19}$, $\frac{16}{44}$, and $\frac{17}{88}$; $\frac{3}{7}$, $\frac{5}{14}$, $\frac{9}{21}$, and $\frac{13}{63}$.

266. $\frac{17}{25}$, $\frac{31}{106}$, $\frac{18}{53}$, and $\frac{18}{125}$; $\frac{18}{24}$, $\frac{32}{72}$, and $\frac{19}{96}$.

267. $\frac{15}{35}$, $\frac{27}{75}$, $\frac{16}{108}$, and $\frac{11}{105}$; $\frac{16}{19}$, $\frac{22}{33}$, and $\frac{40}{76}$.

268. $\frac{4}{5}$, $\frac{6}{7}$, $\frac{14}{35}$, and $\frac{16}{26}$; $\frac{9}{11}$, $\frac{4}{12}$, $\frac{5}{13}$, and $\frac{6}{15}$.

269. $\frac{7}{18}$, $\frac{14}{6}$, $\frac{19}{91}$, and $\frac{14}{81}$; $\frac{8}{16}$, $\frac{12}{20}$, $\frac{10}{25}$, and $\frac{18}{30}$.

270. Find the value of $\frac{16}{25} - \frac{14}{35}$; $\frac{17}{29} - \frac{18}{34}$; $\frac{21}{28} - \frac{22}{26}$.

271. Subtract $\frac{73}{95}$ from $\frac{79}{45}$; $\frac{14}{16}$ from $\frac{18}{14}$; $\frac{22}{17}$ from $\frac{81}{19}$.

Reduce to their least common denominator and add the following:

272. $\frac{2}{5}$, $\frac{4}{8}$, $\frac{3}{6}$, $\frac{1}{7}$.

273. $\frac{4}{12}$, $\frac{8}{17}$, $\frac{9}{15}$.

274. $\frac{5}{6}$, $2\frac{1}{3}$, $4\frac{3}{5}$.

275. $\frac{7}{9}$, $1\frac{6}{10}$, $3\frac{7}{12}$, $\frac{4}{7}$ of $\frac{3}{5}$.

276. $\frac{2}{5}$, $\frac{7}{8}$, $\frac{8}{10}$.

277. $\frac{4}{7}$, $\frac{8}{11}$, $\frac{8}{15}$, $\frac{9}{82}$.

278. $\frac{4}{5}$ of $\frac{5}{6}$, $\frac{5}{8}$ of $\frac{4}{5}$, $3\frac{1}{3}$.

279. $4\frac{1}{5}$, $9\frac{1}{18}$, $15\frac{4}{15}$.

Reduce and subtract the following:

280. $\frac{7}{42} - \frac{3}{63}$.

281. $\frac{12}{21} - \frac{6}{63}$.

282. $\frac{8}{56} - \frac{1}{42}$.

283. $12\frac{3}{8} - 5\frac{2}{5}$.

284. $8\frac{8}{17} - 4\frac{8}{82}$.

285. $1\frac{7}{9} - \frac{2}{5}$.

286. $\frac{7}{200} - \frac{1}{52}$.

287. $14\frac{1}{8} - 6\frac{3}{16}$.

REVIEW PROBLEMS.

REDUCE to their lowest terms:

288. $\frac{30}{48}$; $\frac{28}{63}$; $\frac{64}{84}$.

289. $\frac{77}{121}$; $\frac{48}{272}$; $\frac{209}{380}$.

290. $\frac{805}{2622}$; $\frac{1344}{1536}$; $\frac{6902}{8265}$.

291. $\frac{1261}{1649}$; $\frac{1428}{2652}$; $\frac{2993}{3321}$.

292. $\frac{6006}{8008}$; $\frac{6827}{28997}$; $\frac{8991}{10989}$.

293. $\frac{9504}{10692}$; $\frac{10307}{94637}$; $\frac{13786}{93208}$.

294. $\frac{18577}{20006}$; $\frac{16287}{67818}$; $\frac{23111}{33759}$.

295. $\frac{42287}{75582}$; $\frac{70609}{232001}$.

296. $\frac{4123}{351386}$; $\frac{10767}{203021}$.

297. $\frac{24293}{48569}$; $\frac{61013}{63529}$.

298. $\frac{19557}{156933}$; $\frac{30599}{271469}$.

299. $\frac{10244}{103288}$; $\frac{95469}{359784}$.

300. $\frac{96085}{113555}$; $\frac{108338}{119742}$.

301. $\frac{120916}{133988}$; $\frac{147785}{176990}$.

302. $\frac{428108}{586749}$; $\frac{519176}{692671}$.

303. $\frac{285714}{999999}$; $\frac{180194}{1978594}$.

304. $\frac{1832051}{2592525}$.

Reduce to improper fractions:

305. $1\frac{13}{42}$; $4\frac{83}{210}$; $2\frac{143}{168}$.

306. $5\frac{7}{180}$; $5\frac{27}{56}$; $8\frac{51}{112}$.

307. $3\frac{247}{336}$; $6\frac{113}{957}$.

308. $492\frac{6}{7}$; $3491\frac{29}{66}$.

Find the sum of

309. $\frac{1}{4}+\frac{5}{9}+\frac{5}{12}+\frac{1}{24}$.

310. $\frac{4}{15}+\frac{3}{5}+\frac{7}{20}+\frac{13}{30}$.

311. $\frac{13}{28}+\frac{14}{35}+\frac{21}{49}+\frac{1}{7}$.

312. $\frac{1}{2}+\frac{1}{4}+\frac{1}{6}+\frac{1}{15}+\frac{1}{25}+\frac{1}{60}$.

313. $13+\frac{13}{10}+\frac{13}{100}+\frac{13}{1000}+\frac{13}{10000}+\frac{13}{100000}$.

314. $48\frac{2}{3}+17\frac{2}{11}+8\frac{104}{105}$.

315. $3\frac{8}{9}+16\frac{7}{8}+7\frac{5}{12}+\frac{3}{2}$.

316. $4\frac{5}{9}+\frac{7}{15}+16\frac{9}{20}+25\frac{13}{25}$.

317. $8\frac{1}{2}+7\frac{7}{15}+1\frac{96}{125}+15+4\frac{11}{75}+2\frac{5}{6}$.

318. $3\frac{7}{20}+8\frac{4}{37}+5\frac{19}{111}+1+\frac{11}{15}+7\frac{5}{148}$.

319. $11\frac{10}{253}+5\frac{1}{2}+117+6\frac{18}{46}+5\frac{3}{88}+9\frac{21}{184}$.

320. $7\frac{2}{5}+11\frac{3}{8}+2\frac{5}{14}+16\frac{33}{35}+9\frac{4}{15}+1\frac{19}{21}$.

321. $6\frac{7}{11}+4\frac{1}{2}+1+8\frac{2}{33}+17\frac{3}{8}+53\frac{11}{24}$.

322. $9\frac{7}{8}+11\frac{2}{5}+2+14\frac{3}{5}+101\frac{5}{7}+27\frac{5}{12}$.

323. $12\frac{1}{3}+14\frac{2}{5}+6\frac{3}{7}+7+1\frac{4}{9}+8\frac{5}{11}$.

324. $6\frac{12}{35}+1\frac{5}{33}+13\frac{10}{21}+\frac{4}{15}+5\frac{18}{22}+4\frac{11}{30}$.

325. $9\frac{7}{800}+1\frac{18}{625}+4\frac{41}{64}+5\frac{3}{40}+17+2\frac{1}{128}$.

326. $3\frac{8}{231}+7\frac{15}{841}+14\frac{8}{651}+9+6\frac{78}{217}+15\frac{21}{81}$.

327. $1\frac{79}{80}+2\frac{80}{81}+3+4\frac{83}{84}+5\frac{87}{88}+6\frac{89}{90}$.

328. $2+\frac{3}{2}+\frac{4}{3}+\frac{5}{4}+\frac{6}{5}+\frac{7}{6}+\frac{8}{7}+\frac{9}{8}+\frac{10}{9}+\frac{11}{10}$.

Find the value of

329. $\frac{19}{24}-\frac{13}{18}$; $3\frac{2}{3}-2\frac{1}{6}$.

330. $7-2\frac{9}{10}$; $10\frac{1}{12}-8\frac{1}{9}$.

331. $17\frac{3}{4}-13\frac{5}{6}$; $18\frac{18}{64}-9\frac{2}{3}$.

332. $11\frac{2}{3}-6\frac{5}{8}$; $1\frac{4}{25}-\frac{3}{4}$.

333. $14-7\frac{5}{17}$; $4\frac{3}{7}-2\frac{17}{20}$.

334. $15\frac{3}{7}-7\frac{2}{3}$; $20\frac{5}{18}-8\frac{3}{56}$.

335. $49\frac{5}{11}-13\frac{3}{7}$; $17\frac{3}{15}-8\frac{14}{25}$.

336. $26\frac{3}{28}-15\frac{9}{35}$; $19-12\frac{23}{25}$.

337. $9\frac{3}{13}-2\frac{7}{13}$; $37\frac{18}{47}-19\frac{29}{47}$.

338. $\frac{31}{56}-\frac{19}{48}$; $8\frac{7}{8}-5\frac{4}{9}$.

339. $3\frac{17}{22}-2\frac{13}{24}$; $8\frac{2}{3}-7\frac{4}{5}$.

340. $16\frac{3}{14}-12\frac{32}{63}$; $\frac{26}{87}-\frac{18}{1800}$.

341. $6\frac{3}{5}-2\frac{5}{22}$; $9-1\frac{2}{15}$.

342. $1\frac{1}{2}-1\frac{5}{24}$; $12\frac{17}{68}-8\frac{8}{105}$.

343. $8\frac{1}{6}-2\frac{3}{8}$; $23-11\frac{17}{28}$.

344. $18\frac{6}{85}-4\frac{39}{119}$; $24\frac{103}{110}-13\frac{167}{884}$.

345. $\frac{1}{8}+2\frac{1}{7}+13\frac{3}{10}-3\frac{3}{70}$.

346. $\frac{5}{8}-\frac{3}{8}+\frac{5}{6}-\frac{13}{24}$.

347. $\frac{2}{3}+\frac{1}{2}-\frac{5}{6}+\frac{7}{8}-\frac{5}{24}$.

348. $\frac{2}{3}+\frac{5}{6}+\frac{3}{9}-\frac{11}{12}-\frac{17}{18}$.

349. $\frac{3}{20}+\frac{5}{12}+\frac{4}{15}-\frac{5}{6}$.

350. $3\frac{1}{3}+2\frac{3}{7}-6\frac{3}{9}+1\frac{3}{63}$.

351. $\frac{1}{2}+\frac{1}{81}+\frac{1}{36}-\frac{1}{64}$.

352. $\frac{15}{16}-\frac{14}{15}+\frac{13}{14}-\frac{11}{12}$.

353. $2\frac{1}{9}+3\frac{5}{24}-4\frac{7}{15}-2\frac{11}{30}+1\frac{13}{24}$.

354. $3\frac{4}{8} - 7\frac{5}{9} + 4\frac{1}{2}\frac{6}{7} - 1\frac{1}{8} + \frac{10}{11}$.

355. $\frac{8}{15} + 1\frac{3}{7} - 9\frac{1}{4}\frac{1}{2} + 15\frac{6}{8}\frac{6}{5} - 2\frac{7}{10}$.

356. $3\frac{3}{5} - 4\frac{5}{6} + 6\frac{7}{10} - 1\frac{8}{15} + 2\frac{8}{40}$.

357. $2\frac{1}{6} + \frac{7}{10} + 1\frac{5}{14} - \frac{14}{15} + 5\frac{1}{12}$.

358. $11\frac{1}{6}\frac{3}{8} - 9\frac{2}{10}\frac{9}{8} + 7\frac{1}{18}\frac{7}{9} + 5\frac{4}{2}\frac{5}{8}\frac{5}{8} - 3\frac{6}{15}\frac{1}{8} - 1$.

359. $\frac{11}{12} + (\frac{5}{6} - \frac{4}{5}) + \frac{2}{3}$.

360. What number must be added to the sum of $\frac{4}{5}$, $\frac{7}{8}$, and $\frac{11}{12}$ to make $5\frac{89}{120}$?

361. What is the fraction which added to $\frac{2}{3}$ and $\frac{1}{7}$ is $\frac{4}{7}$ less than $5\frac{1}{3}$?

362. By how much does the sum of $1\frac{1}{26}$ and $\frac{9}{13}$ exceed the difference?

363. Find the least fraction which if added to the sum of $\frac{7}{8}$, $\frac{9}{10}$, and $\frac{29}{12}$ will make the result an integer.

364. What number diminished by the sum of $\frac{1}{6}$ and $\frac{9}{10}$ leaves a remainder of $\frac{4}{5}$?

365. Change 17 to a fraction equivalent in value, whose denominator shall be 17.

366. The sum of three numbers is $19\frac{1}{6}$; the least number is 3 and the greatest number $10\frac{1}{10}$; what is the other number?

367. What number must be added to the difference of $\frac{1}{2}$ and $\frac{1}{3}$ to make $\frac{1}{5}$?

368. A foot rule was shortened $2\frac{1}{3}$ inches at one end, and $\frac{2}{3}$ of an inch at the other; what was the length of the remainder?

369. Pens at 2 for a cent, slate-pencils at 3 for a cent, marbles at 5 for a cent; what would the price of one of each amount to?

370. What fraction of a dollar must be added to $\frac{5}{8}$ of a dollar to make it 75 cents?

371. A man weighing 130 lb. gained $2\frac{1}{2}$ lb. in one week, $3\frac{5}{16}$ lb. the next week, and lost $1\frac{1}{4}$ lb. the third week; what did he then weigh?

372. The difference between $\frac{5}{6}$ and $\frac{9}{11}$ diminished by the difference between $\frac{4}{5}$ and $\frac{5}{16}$ = what?

373. A traveler walked $18\frac{3}{8}$ miles the first day, $2\frac{1}{2}$ miles more on the second day than on the first, and $1\frac{1}{4}$ miles more on the third day than on the second; how far did he walk in the three days?

374. A lives $120\frac{5}{8}$ miles north of a certain city, and B lives $96\frac{1}{22}$ miles south of the same city; how far apart do they live?

375. If a man travels due north $65\frac{1}{8}$ miles, thence due east 20 miles, thence due south $39\frac{7}{8}$ miles, thence due west 20 miles, how far is he then from his starting-place, and in what direction?

376. The numerator of a fraction whose value is $\frac{4}{5}$ is 220; what is the denominator?

377. A vine $18\frac{4}{7}$ feet long grew to be 23 feet in length, while another $12\frac{1}{2}$ feet long grew to be the same length; how much more did the last vine grow than the first?

378. A can jump $5\frac{4}{9}$ feet, B $\frac{1}{4}$ of a foot farther than A, and C $\frac{1}{8}$ of a foot farther than B; how much farther can C jump than A?

379. How far will a man travel in going from a town $16\frac{3}{4}$ miles east of Boston to a town $25\frac{3}{8}$ miles east of Boston?

380. The minuend is $1184\frac{59}{108}$, and the remainder $520\frac{73}{412}$; what is the subtrahend?

381. A railroad-train runs north $120\frac{1}{17}$ miles and returns $61\frac{2}{34}$ miles, while another train runs south 200 miles and returns $110\frac{9}{51}$ miles; how far apart then are the two trains?

382. A rectangular field is $509\frac{3}{18}$ feet long, and $347\frac{1}{16}$ feet wide; what is the distance around the field?

383. $2\frac{1}{8}$ inches $+ 1\frac{5}{9}$ inches $+ 4\frac{7}{8}$ inches $+ 2\frac{1}{4}$ inches lack how much of making one foot?

384. $\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+\frac{1}{5}+\frac{1}{6}$ are how much less than 2? How much more than 1?

385. A sum of money was divided among four men, the first receiving $\frac{1}{18}$, the second $\frac{1}{17}$, the third $\frac{16}{442}$, and the fourth the remainder; what part of the money did the fourth man receive?

386. Add $\frac{1}{5}$, $\frac{1}{8}$, $\frac{1}{12}$, $\frac{5}{16}$, and $\frac{67}{240}$.

387. Add $\frac{1}{3}$, $\frac{2}{5}$, $\frac{3}{4}$, $\frac{5}{7}$, $\frac{6}{11}$, and $\frac{8}{9}$.

388. Add $\frac{2}{7}$, $\frac{5}{9}$, $\frac{10}{11}$, $\frac{12}{13}$, $\frac{15}{16}$, and $\frac{20}{21}$.

389. From $\frac{6}{7} \times \frac{21}{25}$ take $\frac{5}{9} \times \frac{7}{10}$.

390. From $\frac{7}{8} \times \frac{20}{25}$ take $\frac{16}{5} \div \frac{48}{7}$.

391. $\left(\frac{7}{9} \text{ of } \frac{6\frac{1}{2}}{3\frac{1}{2}} \text{ of } \frac{5\frac{2}{5}}{8\frac{2}{3}}\right) \times \left(\frac{2\frac{1}{2}}{3\frac{1}{4}} \text{ of } \frac{8\frac{2}{5}}{6\frac{1}{4}}\right) = \text{what?}$

392. $(3\frac{1}{4} - 2\frac{1}{2} + 5\frac{2}{7}) \times (6\frac{1}{2} - 4\frac{1}{8} + 2\frac{1}{8}) = \text{what?}$

393. Find the value of $(7\frac{1}{8} + 6\frac{3}{11} - 11\frac{7}{9}) \div (6\frac{1}{4} + 5\frac{3}{7} - 10\frac{2}{7})$.

394. Find the value of $(3\frac{1}{4} + 7\frac{1}{9} - 3\frac{2}{5}) \div (7\frac{1}{5} \div 3\frac{3}{5})$.

395. What is the value of $\frac{2\frac{1}{3}}{7}$ of $\frac{6\frac{1}{4}}{5\frac{2}{7}}$ of $\frac{10\frac{4}{7}}{11\frac{5}{11}}$ of $\frac{4\frac{2}{5}}{16}$?

396. What is the value of $\left(\frac{3\frac{1}{3}}{5\frac{5}{9}} \text{ of } \frac{6\frac{1}{7}}{12\frac{2}{7}}\right) \times \left(\frac{6\frac{3}{4}}{8\frac{1}{8}} \times \frac{5}{9}\right)$?

397. Add $\frac{1}{2}$, $\frac{3}{5}$, $\frac{4}{7}$, $\frac{8}{9}$, $\frac{10}{11}$, and $\frac{12}{13}$.

398. Add $\frac{2}{3}$, $\frac{43}{8}$, $\frac{6}{7}$, $\frac{8}{11}$, $\frac{12}{13}$, and $\frac{15}{16}$.

399. From $\frac{7}{8} \times \frac{6}{5}$ take $\frac{3}{5} \times \frac{3\frac{1}{3}}{7\frac{1}{2}}$.

400. From $\frac{4}{16} \times \frac{8}{25}$ take $\frac{14}{62} \times \frac{81}{98}$.

401. $\left(\frac{6}{7} \text{ of } \frac{2\frac{2}{3}}{8\frac{2}{5}} \text{ of } \frac{5\frac{1}{4}}{6\frac{2}{5}}\right) \times \left(\frac{3\frac{1}{5}}{4} \text{ of } \frac{7\frac{1}{5}}{6\frac{1}{4}}\right) = \text{what?}$

402. $\left(\frac{7\frac{1}{8}}{19} \text{ of } \frac{13}{5} \text{ of } \frac{9\frac{1}{2}}{6\frac{2}{3}}\right) \div \left(\frac{2\frac{1}{2}}{5\frac{1}{3}} \text{ of } \frac{1\frac{1}{4}}{5}\right) = \text{what?}$

403. Find the value of $(6\frac{1}{4} \times 7\frac{4}{5}) \div (4\frac{1}{8} \times 7\frac{1}{2})$.

404. Find the value of $\left(3\frac{1}{4} + \frac{6}{2\frac{2}{3}} - \frac{7}{3\frac{1}{4}}\right) \div \left(\frac{2\frac{1}{2}}{3\frac{1}{5}} \text{ of } \frac{6\frac{1}{2}}{9\frac{1}{8}}\right)$.

405. What is the value of $\left(\frac{3\frac{1}{2}}{7\frac{7}{8}} + 2\frac{1}{4} - 1\frac{1}{8}\right) \times \left(\frac{3\frac{1}{2}}{7} - \frac{1}{7}\right)$?

406. What is the value of $\left(3\frac{1}{7} \text{ of } \frac{7\frac{7}{8}}{3\frac{2}{8}}\right) \times (\frac{2}{3} \text{ of } \frac{6}{7} \text{ of } 5)$?

407. What are the two fractions whose difference is $\frac{16}{25}$ and whose sum is $\frac{81}{250}$?

408. What are the two fractions whose difference is $\frac{2}{7}$ and whose sum is $\frac{12}{17}$?

409. What fraction multiplied by $3\frac{4}{7}$ equals $\frac{5\frac{1}{6}}{\frac{2}{5}}$?

410. What fraction multiplied by $\frac{2\frac{1}{2}}{1\frac{2}{3}}$ equals $7\frac{1}{2}$?

411. If the dividend is $6\frac{1}{3}$ and the quotient is $\frac{1\frac{1}{3}}{5\frac{1}{3}}$, what is the divisor?

412. The multiplier is $\frac{2\frac{1}{5}}{25\frac{2}{3}}$, the product is $8\frac{1}{2}$; what is the multiplicand?

413. The sum of two fractions is $3\frac{2}{5}$, and three times their difference is $2\frac{2}{5}$; what are the fractions?

414. Multiply $\frac{2}{3}$ of $\frac{4}{7}$ by $25 \div 7\frac{1}{4}$, and divide the result by $6\frac{1}{4}$.

415. Divide $11\frac{3}{5}$ by the difference of $8\frac{1}{3}$ and $7\frac{1}{6}$.

416. $\frac{2}{47}$ divided by $\frac{2}{5}$ of $\frac{7}{18}$ = what?

417. $\frac{11}{48}$ divided by $\frac{5\frac{1}{2}}{9}$ = what?

418. How many times is $21\frac{3}{11}$ contained in $40\frac{2}{21}$?

419. Change $\frac{5}{7} \div \frac{6}{11}$ to a simple fraction.

420. Divide $4\frac{2}{15}$ by the sum of $1\frac{1}{5}$ and $2\frac{1}{3}$.

421. $19\frac{19}{20}$ divided by $\frac{3}{7}$ of $\frac{4}{14}$ = what?

422. How many times is $\frac{1\frac{1}{2}}{5\frac{1}{3}}$ contained in 164?

423. The dividend is $\frac{9\frac{1}{3}}{7\frac{1}{7}}$, the divisor is $\frac{2}{3}$ of $\frac{1}{2}$; what is the quotient?

424. The quotient is $\frac{3}{7}$, the divisor is $7\frac{1}{2}$; what is the dividend?

425. Divide $31\frac{1}{4} + 4\frac{1}{11}$ by $17\frac{1}{3} - 2\frac{1}{3}$.

426. How many times is $13\frac{3}{7}$ contained in $25\frac{1}{15}$?

427. How many times is $52\frac{1}{15}$ contained in $67\frac{1}{2}$?

428. Change $\frac{3}{7}$ of $1\frac{1}{14}$ of $\frac{7}{9}$ of $5\frac{5}{13}$ to a simple fraction.

429. Find the difference between $9\frac{1}{3} + 11\frac{1}{2}$ and $11\frac{1}{4} - 9\frac{1}{3}$.

430. If $\frac{3}{7}$ of a pound of tea costs $37\frac{1}{2}$ ct., what will $2\frac{1}{3}$ lb. cost?

431. Find the difference between $3\frac{1}{8} \times 5\frac{1}{6}$ and $7\frac{2}{5} \div 1\frac{3}{5}$.

432. If 30 yd. of cloth cost $\$121\frac{1}{2}$, what is the cost of 1 yd.?

433. Multiply $13\frac{1}{4}$ by $1\frac{7}{8}$, subtract $4\frac{1}{3}$, and then divide by $6\frac{1}{2}$.

434. If $15\frac{1}{2}$ pounds of starch cost \$1.24, what is the cost of 1 pound?

435. How many times is $\frac{2}{45}$ contained in $\frac{4}{9}\frac{8}{5}$?

436. How many times is $\frac{7}{11}$ of $\frac{2}{3}$ contained in $\frac{6}{7}$ of $\frac{8}{9}$?

437. Change $\frac{25\frac{1}{2}}{19\frac{1}{3}} \div \frac{24\frac{1}{6}}{18\frac{1}{6}}$ to a simple fraction.

438. Multiply $121\frac{2}{7} + 6\frac{1}{3}$ by $121\frac{2}{3} \div 6\frac{2}{3}$.

439. The dividend is $\frac{1}{16}$, the quotient is $\frac{16}{15}$; what is the divisor?

440. Divide 177 by the sum of $19\frac{3}{5}$ and $18\frac{1}{2}$.

441. The divisor is $5\frac{3}{4}$, the quotient is 12; what is the dividend?

442. Change $24 \div \frac{3}{4}$ of $4\frac{1}{2}$ to a simple fraction.

443. How many times is 9 contained in $\frac{1}{4}\frac{8}{9}$?

444. How many times is $\frac{1\frac{1}{2}}{7}$ contained in $\frac{1}{5}$?

445. How many times is $100\frac{1}{2}$ contained in $6\frac{1}{16}$?

446. How many times is $\frac{9}{10}\frac{7}{8}$ contained in $\frac{1}{4}$ of $\frac{8}{5}$?

447. If $3\frac{1}{5}$ pounds of sugar cost 32 cents, what is the cost of $7\frac{1}{3}$ pounds?

448. How many suits, each requiring $4\frac{1}{16}$ square yards, can be made from a piece containing $41\frac{2}{3}$ square yards, and how many square yards will be left?

449. The numerator is 4, and the value of the fraction is $\frac{8}{7}$; what is the denominator?

450. What number multiplied by $1\frac{3}{17}$ gives 23 for the product?

451. What is the cost of $6\frac{3}{5}$ lb. of tea, if $9\frac{2}{3}$ lb. cost $\$8.79\frac{2}{3}$?

452. Divide $7\frac{1}{16}\frac{2}{9}$ by $19\frac{7}{12}$; by $21\frac{3}{7}$; by $27\frac{5}{11}$.

453. What number divided by $6\frac{7}{15}$ gives $3\frac{1}{3}$ as the quotient?

454. The product of two factors is $18\frac{3}{8}$, and the less is $3\frac{1}{11}$; what is the other?

455. What is the cost of 311$\frac{3}{8}$ lb. of coffee, if 6$\frac{1}{8}$ lb. cost $1.72?

456. If a man can walk 17$\frac{1}{4}$ miles in 4$\frac{1}{2}$ hours, how long will it take him to walk 324$\frac{5}{8}$ miles at the same rate?

457. If 86$\frac{1}{4}$ cubic feet of wood cost $3.75, what is the cost of 11$\frac{1}{3}$ cords, 1 cord being equal to 128 cubic feet?

458. A man can walk 115$\frac{6}{7}$ miles in 3$\frac{1}{3}$ days of 11$\frac{2}{3}$ hours each; how far can he walk in 16$\frac{1}{4}$ hours?

459. Find the weight of 9072 cu. in. of marble, if 36 cu. in. weigh 3$\frac{1}{2}$ pounds.

460. If 7$\frac{1}{5}$ yards of cloth cost $2.25, what is the cost of 18$\frac{2}{7}$ yards?

461. If 3 men start at the same moment to walk around a race-track 1 mile in length, the first walking 11$\frac{1}{2}$ miles in 2$\frac{1}{3}$ hours, the second 10$\frac{1}{5}$ miles in 2$\frac{1}{4}$ hours, and the third 9 miles in 1$\frac{4}{5}$ hours, when will they all come together again at the starting-point?

462. What is the value of 6$\frac{1}{8}$ A. of land, at the rate of $125 for 5$\frac{3}{5}$ A.?

463. How many minutes in $\frac{2}{3}$ of $\frac{5}{6}$ of 6$\frac{3}{4}$ days, there being 1440 minutes in one day?

464. How many ounces in 2$\frac{2}{5}$ times 3$\frac{1}{7}$ times $\frac{3}{8}$ of $\frac{1}{11}$ ton, if one ton contains 32000 ounces?

465. What is the cost of 18 acres, at the rate of $600 for 29$\frac{1}{2}$ acres?

466. $2\frac{1}{17} \div 6\frac{4}{11}$ = what?

467. By what number must $\frac{3\frac{1}{8}\frac{0}{7}}{\frac{8}{7}\frac{3}{4}}$ be multiplied, that the product shall be 1?

468. I bought a quantity of tea for 27\frac{9}{16}$, and, disposing of it for $\frac{3}{4}$ of its cost, I lose 10$\frac{1}{2}$ cents on a pound; how many pounds did I buy?

469. Find the least whole number that will contain $\frac{3}{7}$, $\frac{4}{11}$, and $\frac{5}{9}$ without a remainder.

470. Find the greatest common divisor of 1$\frac{1}{3}$, 2$\frac{1}{2}$, and 3$\frac{1}{4}$.

471. What is the least common multiple of 6$\frac{1}{7}$, 5$\frac{1}{3}$, and 7$\frac{3}{5}$?

472. What is the greatest common divisor of $\frac{6}{7}$, $\frac{8}{9}$, and $4\frac{2}{5}$?

473. Add $\frac{21}{25}$, $\frac{81}{85}$, $\frac{41}{45}$, $\frac{9}{11}$, $\frac{15}{16}$, and $\frac{18}{28}$.

474. What is the value of $\frac{2}{3}$ of $\frac{7}{8}$ of $\frac{6}{5}$ of $\frac{10}{21}$?

475. How many bottles, capable of holding $1\frac{1}{7}$ pints each, will it take to contain 112 pints?

476. Multiply $\frac{3}{7}$ of $\frac{14}{15}$ of $\frac{5}{6}$ by $2\frac{1}{4}$ times $7\frac{1}{3}$.

477. Divide $2\frac{2}{4} \times 5\frac{1}{5} \times 5\frac{10}{11}$ by $6\frac{1}{4}$ times $\frac{2}{5}$.

478. What will $7\frac{1}{3}$ cubic feet of lead weigh, if $3\frac{1}{5}$ cubic feet weigh 2212 lbs.?

479. From $\frac{7}{8}$ of $\frac{8}{9}$ of $\frac{8}{14}$ take $\frac{4}{5}$ of $\frac{10}{18}$ of $\frac{26}{48}$ of $\frac{1}{4}$.

480. Find the least number that can be divided by $2\frac{1}{7}$, $3\frac{1}{5}$, $4\frac{1}{2}$, and $\frac{5}{8}$ without a remainder.

481. What is the greatest common divisor of $\frac{2}{3}$, $2\frac{1}{8}$, and $4\frac{1}{2}$?

482. Simplify $\dfrac{2\frac{1}{7} \times 4\frac{1}{2} \times 6\frac{2}{3}}{3\frac{1}{2} \times 4\frac{27}{49} \times 4}$.

483. Express $\frac{7}{49}\frac{8}{5} \times \frac{5}{66}\frac{4}{}$ in its lowest terms.

484. What will $59\frac{3}{7}$ quarts of wine cost, at $\$1.12\frac{1}{2}$ for $\frac{4}{5}$ of a quart?

485. A vessel sails $61\frac{1}{2}$ miles in $4\frac{2}{3}$ hours; how long will it take her to go $310\frac{3}{4}$ miles?

486. How many times is $3\frac{6}{7}$ contained in $\frac{29}{4}\frac{7}{}$?

487. How many times is $4\frac{1}{3}$ contained in $7\frac{1}{5}$?

488. How many times is $3\frac{3}{5}$ contained in $6\frac{3}{5}$?

489. A and B together bought $21\frac{3}{7}$ tons of hay, at $\$17\frac{1}{2}$ per ton, A's part costing \$3 more than B's; A sells $\frac{1}{3}$ of his hay at \$18 per ton, and the rest at \$17.60 per ton; B sells all of his at the rate of $\$13\frac{1}{2}\frac{3}{0}$ for $\frac{3}{4}$ of a ton. How much money does each gain?

490. Divide \$39.45 among 23 boys and 37 girls, and give to each boy 15 cents more than each girl receives; how much money will each boy and each girl receive?

491. $\frac{5}{13}$ of a certain number is 72 less than the number itself; what is the number?

492. A man sold $\frac{2}{5}$ of a flock of sheep, and lost $\frac{1}{12}$ of what remained, and then had 44 sheep; how many were there in the flock at first?

493. $189\frac{7}{8}$ acres are $89\frac{23}{24}$ acres more than $\frac{11}{36}$ of Smith's land; how many acres are there in Smith's land?

494. With $\frac{3}{7}$ of his money John can buy 13 more oranges, at 2 cents apiece, than he can buy with $\frac{2}{5}$ of his money; how much money has he?

495. If a car-wheel is $8\frac{7}{12}$ feet in circumference, how many times will it turn in running $12\frac{7}{8}$ miles, 1 mile being equal to 5280 feet?

496. A man owning $\frac{6}{17}$ of a ship sold $\frac{5}{12}$ of his share for \$3050; what is the value of the whole ship, at this rate?

497. If A can mow two acres of grass in $10\frac{2}{3}$ hours, and B can mow $\frac{4}{5}$ of an acre in $4\frac{4}{7}$ hours, how many acres can they mow, working together, in $6\frac{2}{3}$ hours?

498. $\frac{175}{648}$ is the product of two fractions, one of which is $\frac{25}{36}$; what is the other?

499. What fraction divided by $\frac{7}{8}$ of $\frac{12}{55}$ gives a quotient equivalent in value to $\frac{11\frac{3}{5}}{22\frac{1}{2}}$?

500. $354\frac{9}{16}$ is $78\frac{5}{12}$ less than the sum of two numbers, and the greater number is $55\frac{3}{16}$ more than the less; what are the numbers?

501. The product of three factors is $\frac{15}{49}$, and two of the factors are $\frac{5}{28}$ and $\frac{9}{35}$; what is the third factor?

502. What number diminished by $\frac{7}{15}$ of itself equals $160\frac{8}{9}$?

503. A paid $\frac{3}{7}$ of his money for clothes, and \$39 on account of rent, and then had $\frac{1}{5}$ of the original sum left; how much money had he at first?

504. Bought $\frac{3}{4}$ of $\frac{5}{9}$ of a ship for $\frac{1}{2}$ of $\frac{3}{7}$ of \$119000; what was the whole value of the vessel at the same rate?

505. A certain farm consists of 5 fields; the first contains $17\frac{3}{4}$ acres, the second $12\frac{1}{5}$ acres, the third contains as much as the first two, the fourth $19\frac{1}{3}$ acres, and the fifth contains a quantity equal to the difference between the third and fourth; how many acres in the farm?

506. If a boy can do a certain work in $17\frac{1}{2}$ days, what part of it can he do in $11\frac{1}{5}$ days?

RELATION OF NUMBERS.

CASE I.

507. WHAT part of 96 is 36? Of 36 is 96?

508. What part of 216 is 84? Of $21.60 is $4?

509. What part of 1547 is 380? Of 380 is 1547?

510. What part of 246 is 72? Of $.246 is $.72?

511. What part of 316 is 104? Of $1\frac{1}{7}$ is $1\frac{2}{5}$?

512. What part of 26 is $\frac{5}{8}$? Of $\frac{5}{8}$ is 26?

513. What part of 310 is $8\frac{2}{4}$? Of $\frac{7}{8}$ is $\frac{3}{7}$?

514. What part of 65 is $4\frac{1}{3}$? Of $1\frac{3}{8}$ is $6\frac{1}{2}$?

515. What part of $73\frac{2}{8}$ is $15\frac{3}{7}$? Of $3\frac{1}{4}$ is $4\frac{1}{3}$?

516. What part of $3.55 is $.65? Of $\frac{2}{5}$ is $\frac{8}{5}$?

517. Out of 16 pounds of coffee I sold $5\frac{1}{3}$ pounds; what fraction of the whole did I sell?

518. From $11\frac{2}{3}$ acres of land I sold $2\frac{1}{3}$ acres; what fraction of the whole did I sell?

519. From $16\frac{4}{5}$ yards of cloth, $4\frac{2}{3}$ yards were sold; what fraction of the whole remained?

520. Out of $42\frac{2}{3}$ gallons of oil, $17\frac{2}{3}$ gallons were sold; what part of the whole was sold?

521. A man had $16\frac{2}{3}$ dozen eggs, and sold $6\frac{1}{4}$ dozen; what fractional part of the remainder was the part sold?

522. If $24\frac{3}{4}$ cubic feet of stone make a perch, what part of $3\frac{5}{8}$ perches is $4\frac{2}{3}$ cubic feet?

523. From an acre of land (4840 square yards) I sold $30\frac{1}{4}$ square rods $9\frac{1}{2}$ square yards; what part of an acre did I sell, if 160 rods make an acre, and $30\frac{1}{4}$ yards make a rod?

524. What part of two hundred and fifty dollars five mills is $3.17?

525. What part of $272\frac{1}{4}$ square feet is $\frac{1}{3}$ of $9\frac{1}{2}$ times $3\frac{1}{4}$ square feet?

526. What part of $1\frac{1}{2}$ barrels is $16\frac{1}{2}$ gallons, if $31\frac{1}{2}$ gallons make a barrel?

527. If 10080 minutes make a week, what fraction of $4\frac{1}{4}$ weeks is $1260\frac{2}{3}$ minutes?

CASE II.

528. 616 yards is $\frac{8}{15}$ of the number of yards in a piece of rope; how long is the rope?

529. A steamboat traveled 189 miles in the day, which was $\frac{9}{7}$ of the distance it went in the night; how far did it go in the night?

530. Mr. Williams owns 6 horses, which is $\frac{3}{23}$ of the number of his cows, and $\frac{6}{75}$ the number of his sheep; how many animals has he?

531. John loses \$14, which is $\frac{7}{19}$ of what he has left; how much had he at first?

532. If $\frac{3}{8}$ of a pound of tea cost \$.96, what cost $5\frac{5}{11}$ pounds?

533. If $5\frac{2}{3}$ yards of cloth cost \$5.10, what cost $16\frac{7}{15}$ yards?

534. A boy rowed 12 miles with the tide, which is $\frac{5}{7}$ of the distance he rowed against it; how far did he row altogether?

535. John shot 231 birds, which is $\frac{33}{35}$ of the number shot by James; how many did both shoot?

536. If $\$6\frac{2}{5}$ is $\frac{3}{4}$ the cost of 5 yards of cloth, what will $13\frac{3}{7}$ yards cost?

537. If $\frac{3}{11}$ of the value of a house is \$1752, what is the value of $\frac{8}{9}$ of the house?

538. Paid \$12250 for $\frac{7}{19}$ of an estate; what is the value of $\frac{12}{13}$ of the estate at the same rate?

539. 1760 yards is $\frac{8}{25}$ of how many yards?

540. If $\frac{3}{16}$ of a certain number is $27\frac{1}{5}$, what is the number?

541. Bought $\frac{19}{20}$ of a farm for $\frac{3}{4}$ of its value; what would the whole farm have cost me at the same rate, if $\frac{2}{3}$ of its value is $\frac{5}{6}$ of \$16000?

542. If $9\frac{1}{4}$ pounds of sugar cost $92\frac{1}{2}$ cents, what cost $225\frac{1}{2}$ pounds, at the same rate?

543. A farmer paid \$229.50 for some cattle, which is $\frac{9}{14}$ of what he paid for some improvements on his farm; what was $\frac{8}{11}$ of the cost of the improvements?

544. If $\frac{9}{13}$ of a barrel of flour costs \$4.50, what is the cost of $23\frac{1}{3}$ barrels, at the same rate?

BILLS AND ACCOUNTS.

1. FIND the cost of each article in the following bill, and write the sum in the outer column:

Philadelphia, Jan. 27, 1879.

Mr. Wm. Reed,

Bought of O. F. GREEN & Co.

Terms Cash.

15	Lb. of Java Coffee,	@ 27¢				
21	Lb. of Granulated Sugar,	@ 9¢				
5	Lb. of Oolong Tea,	@ $1.17				
9	Lb. of Dried Quinces,	@ 23¢				
27	Lb. of Best Corn Meal,	@ 3½¢				

Make out the following bills in proper form:

2. Henry Smith, of Chicago, sold J. K. Wilkins, Jan. 5, 1878, 635 pounds of honey, at 33 cents a pound; 61 firkins of butter, each containing 25 pounds, at $.43 a pound; 603 cans of tomatoes, at $.25 a can.

3. Frank Johnson, of Washington, D. C., sold Peter N. Sloan, May 16, 1877, 2140 gallons of wine, at $5.75 a gallon; 1450 gallons of brandy, at $4.50 a gallon; 25 cases of brown stout, each holding 2 dozen bottles, at $.15 a bottle.

4. James Howard, of New York, sold Millard, Bowens & Co., August 17, 1876, 643 bushels of wheat, at $.93 a bushel; 715 bushels of corn, at $.65 a bushel; and 550 bushels of rye, at $.48 a bushel.

5. J. North & Co., of Philadelphia, sold Powers & Weightman, Feb. 26, 1879, 61 tons of stove coal, at $5.75 a ton; 45 tons of egg coal, at $6.25; and 25 tons of broken coal, at $6.45 a ton.

6. G. Scott bought of T. Clark, of Chester, Sept. 23, 1875, 26 barrels of fish, at $17.75 a barrel; 25 barrels of flour, at $6.25 a barrel; and 17 barrels of pork, at $12.50 a barrel.

7. F. H. Black, of Scranton, sold T. G. Loehring, Oct. 19, 1878, 61 tons of steel rails, at $57.50 a ton; 30 tons of iron, at $26 a ton; and 10 tons of pig iron, at $10 a ton.

8. G. Murphy, of Baltimore, sold E. Price, Nov. 25, 1873, 21 bushels of oats, at $.57 a bushel; 42 bushels of apples, at $.78 a bushel; and 12 bushels of peaches, at $1.65 a bushel.

9. J. C. Townshend, of St. Louis, sold G. Thomson, April 19, 1879, 64 cattle, at $30 a head; 110 sheep, at $6 apiece; and 212 hogs, at $5.25 each.

10. Green & Baker, of Trenton, sold L. N. Wilson, March 28, 1879, 35 pieces of broadcloth, each 20 yards, at $2.45 a yard; 26 pieces of summer cassimere, at $12 a piece; and 13 pieces of mixed cassimere, at $41.75 a piece.

11. G. Abbott & Co., of Columbia, sold J. K. Johnson, Jan. 3, 1878, 27 tons of hay, at $16.75 a ton; 14 cords of pine, at $4.75 a ton; 13 cords of hickory, at $5.25 a cord.

12. K. Smith, of Cincinnati, sold G. Mapleson, Oct. 11, 1877, 6 dozen Webster's Academic Dictionary, at $20.15 a dozen; 23 dozen New American Practical Arithmetic, at $6 a dozen; and 16 sets of Chambers's Encyclopædia, in 10 volumes, at $4.25 per volume.

Arrange the following accounts in proper form:

13. F. U. Larkins, of Wilmington, sold Henry Dorn, Jan. 14, 1879, 16 barrels of flour, at $7.25 a barrel; 14 barrels of flour, at $6.75 a barrel; 20 barrels of cornmeal, at $3.65 a barrel; he received 50 bushels of wheat, at $.93 a bushel, 61 bushels of corn, at $.65 a bushel, and the balance in cash.

14. J. N. Steele, of Boston, sold G. R. Williams, April 11, 1871, 67 bushels of oats, at $.43 a bushel; 11 bales of hay, at $1.13 a bale; 37 bushels of mixed feed, at 54 cents a bushel; he received $12.17 in cash, and the remainder in butter, at $.45 a pound.

15. G. U. Gunn, of Richmond, sold H. F. Brown, March 19, 1876, 13 horses, at $175 apiece; 215 sheep, at $4 a head; and 113 pigs, at $2.25 apiece; he received $2250 cash, 60 barrels of flour, at $6 a barrel, and the remainder in tea, at $.75 a pound.

16. K. L. Jones, of San Francisco, sold P. N. Dease, Feb. 27, 1879, 450 bales of cotton, at $66 a bale; 350 bales, at $63 a bale; and 250 bales, at $61 a bale; he received $11000 cash; 320 U. S. bonds worth $125 each, and the remainder in steel rails, at $66⅔ a ton.

17. J. L. Funk, of Denver, sold W. K. Wilson, Aug. 17, 1878, 300 shares of Sierra Nevada mining stock, at $45 a share; 160 shares of Yellow Jacket, at $23 a share; and 100 shares of Best & Belcher, at $31 a share; he received $10000 in U. S. 5–20 $1000 bonds, 20 imported cattle, at $500 apiece, and the remainder in cash.

18. F. R. Jamieson, of New York, sold P. T. Green, Oct. 11, 1877, 45 reams of paper, at $3.65 a ream; 36 boxes of steel pens, at $.87½ a box; and 20 bottles of ink, at $.35 apiece; he received 12 barrels of apples, at $2.45 a barrel, 100 bushels of potatoes, at $1.35 a bushel, and the balance in cash.

19. *Jan. 1, 1879.*

Mr. T. G. Peters,

To J. N. SAUNDERS, Dr.

Aug. 1, To 20 bushels of peaches, at $1.75 a bushel; 8 bushels of pears, at $1.50 a bushel; Sept. 25, to 25 bushels of apples, at $.90 a bushel; Nov. 6, to 25 bushels of potatoes, at $.95 a bushel.

Cr.

Sept. 4, By 50 pounds of sugar, at $.10 a pound; 10 pounds of coffee, at $.35 a pound; 5 pounds of tea, at $1.25 a pound; Oct. 1, by $5, cash; 50 brooms, at $.25 each; Nov. 8, by 65 buckets, at $.50 each, and $10.55 worth of groceries; Nov. 15, by 100 pounds of sugar, at 10 cents a pound.

DENOMINATE NUMBERS.

REDUCTION.

ENGLISH MONEY.

1. Reduce £12 17 s. 7 d. to pence.

2. Reduce £115 16 s. to shillings.

3. Reduce £13 15 s. 7 d. 2 far. to farthings.

4. Reduce £141 1 s. 6 d. to pence.

5. Reduce £76 18 s. 5 d. 1 far. to farthings.

6. Reduce £765 11 s. to shillings.

7. I purchased 150 yards of cloth for 189 guineas; how many shillings did the cloth cost?

8. A man earned £5 12 s. 6 d. in 12 days; how many farthings did he earn each day?

9. If a book cost 9 d., how many can be bought for £6 5 s. 3 d.?

10. If a box of paints cost 3 s., how many boxes can I buy for £14 2 s.?

11. Change 1156 d. to pounds.

12. Change 468 s. to pounds.

13. Change 6510 far. to pounds.

14. Change 256 d. to shillings.

15. Change 1242 far. to shillings.

16. Change 6000 d. to guineas.

17. I sold 50 caps for 4260 far.; how many pence did I receive?

18. If I pay 6321 s. for 350 barrels of apples, what is their value in guineas?

19. Paid 286 d. for a box of oranges; how many shillings did it cost?

20. If a cow cost £30, how many cows can be bought for 21600 d.?

AVOIRDUPOIS WEIGHT

21. REDUCE 6 T. 13 cwt. 14 lb. to lb.

22. Reduce 11 T. 17 cwt. 6 oz. to oz.

23. Reduce 214 T. 15 cwt. to cwt.

24. Reduce 14 cwt. to oz.

25. Change 3206 oz. to cwt.

26. Change 64052 lb. to T.

27. Change 129000 oz. to tons.

28. How many tons in 12640 lb.?

29. How many lb. in 642 oz.?

30. If a barrel of flour weighs 196 lb., how much will 250 barrels cost, at $4\frac{1}{2}$ cents a lb.?

31. What cost 1 cwt. 35 lb. of coffee, at 2 cents an oz.?

32. What cost a haystack containing 18000 lb., at $17 a ton?

33. What cost 256 oz. of sugar, at 9 cents a lb.?

34. What will be the freight on 38080 oz. of coal, if the freight is $\frac{1}{200}$ of a cent a lb.?

35. What cost 3000 pounds of nails, at $5 a cwt.?

TROY WEIGHT.

36. How many grains in 12 lb. 4 oz. 12 pwt.?

37. Reduce 6 lb. 14 pwt. to grains.

38. Reduce 7 lb. 11 oz. to pwt.

39. Reduce 7 oz. 13 pwt. to grains.

40. How many lb. in 23400 grains?

41. Change 2160 pwt. to lb.

42. Change 4140 oz. to lb.

43. Change 2520 grains to oz.

44. Change 612 pwt. to oz.

45. If an ounce of silver cost $2.45, what will be the cost of 2 dozen silver spoons, each weighing 1 oz. 11 pwt. 16 gr.?

46. What is the value of 142 pounds of gold, at $19.50 an ounce?

APOTHECARIES' WEIGHT.

47. REDUCE 1 ℔ 6℥ 5℈ to grains.

48. Reduce 3 ℔ 7℥ 5℈ to scruples.

49. Reduce 12℔ 9℥ to drachms.

50. Reduce 11℥ 7℈ to scruples.

51. Change 16200 gr. to ℔.

52. Change 6473 ℈ to higher denominations.

53. How many ℥ in 256 ℈?

54. Change 17100 gr. to ℥.

55. How many ℔ in 864 ℨ?

56. Change 6000 gr. to ℨ.

57. How many doses of magnesia, each 2 drachms, can be made from 13 ℔ 5℥?

58. How many doses of sulphate of quinia, each 15 gr., can be made from 1℥ 6℈ of that substance?

59. How many pills, containing 8 grains each, can be made from 10 lb. avoirdupois?

DRY MEASURE.

60. REDUCE 16 bu. 3 pk. 7 qt. to pints.

61. Reduce 8 bu. 2 pk. 5 qt. to quarts.

62. Reduce 275 bu. to pecks.

63. Reduce 296 qt. to pecks.

64. Change 1440 pints to pecks.

65. Change 10080 pints to bushels.

66. Change 664 quarts to bushels.

67. Change 1624 quarts to pecks.

68. How many pints in 2 pecks 7 qt.?

69. What cost 14 bushels of tomatoes, at 15 ct. a quart?

70. What cost 70 pecks of peaches, at 10 cents a quart?

71. What cost 1280 pints of corn, at $.65 a bushel?

72. What cost 240 pints of chestnuts, at $1.50 a peck?

73. What cost 50 bu. of beans, at $.06¼ a quart?

LIQUID MEASURE.

74. REDUCE 16 gal. 2 qt. 1 pt. to gills.

75. Reduce 73 gal. 3 pt. to pints.

76. Reduce 717 gal. 2 qt. to quarts.

77. Change 896 gills to gallons.

78. What cost a pint of molasses, at $1.04 a gallon?

79. What cost 3 qt. 1 pt. of coal oil, at 31 cents a gallon?

80. A family use 2 quarts of milk a day; what is the cost of milk for them in a leap year, if milk is 24 cents a gallon?

81. A grocer bought a barrel (31½ gal.) of cider for $8.75; how much must he charge a pint to gain $3.85?

82. A man bought a hogshead (63 gal.) of molasses for 2 cents a gill; what did it cost him?

83. A man paid $126 for a barrel (31½ gal.) of wine; a gallon and a half leaked out; for how much per quart must he sell the remainder in order to gain $18?

84. A physician wishes to put 3 gallons of hartshorn in bottles holding 3 gills each; how many bottles must he use?

LONG MEASURE.

85. How many inches in 5 mi. 5 rd. 5 yd. 2 ft.?

86. How many feet in 50 mi. 120 rd. 4 yd. 1 ft.?

87. Reduce 1 mi. 27 rd. to feet; to inches.

88. Reduce 33 rd. 4 yd. 1 ft. to inches.

89. Reduce 7 mi. 33 rd. to yards; to feet.

90. Reduce 9 mi. to rods.

91. How many rods in 1089 feet?

92. How many miles in 10560 yards?

93. How many rods in 66000 inches?

94. How many miles in 31680 feet?

95. How many yards in 516 fathoms?

96. How many steps, each 2 ft. 6 in. long, will I take in going 22 mi.?

SQUARE MEASURE.

97. How many acres of land can be purchased for $147500, at $2.50 per square foot?

98. How many acres in a tract of land which contains 2787840 sq. ft.?

99. The number of square inches in a certain lot of ground is 2090880; how many rods, yards, and feet does it contain?

100. How many lots each containing half an acre can be cut from a field that contains 309759 square rods, 30 square yards, 2 square feet, 36 square inches?

101. Reduce 15 sq. mi. to square inches.

102. Change 155520 sq. in. to square rods.

103. Reduce 6 A. to square yards.

104. Change 6050 sq. yd. to acres.

105. Reduce 11 sq. rd. to square feet.

106. Change 256000 sq. rd. to square miles.

107. At $17 an acre, what is the cost of a tract of land 9 miles square?

108. If a man can hoe 65 sq. yd. in 8 hours, in how many days, of $9\frac{3}{5}$ hours each, can he hoe 4 A. 140 sq. rd?

109. If a man can plough 120 sq. rd. in a day, how long will it take him to plough five 15-acre fields?

110. If a farmer mows 150 sq. rd. in a day, how long will it take him to mow a square mile?

111. At $25 an acre, what is the cost of 27878400 sq. ft.?

112. How many boards, each 720 sq. in. in surface, will be needed to build a fence which requires 39 sq. rd. 204 sq. yd. of boards?

113. How many pieces of paper, each piece 12 yd. long and $\frac{1}{2}$ yd. wide, will be required to paper 13 sq. rd. of wall?

114. A slate is $2\frac{3}{4}$ ft. square, and another of the same extent of surface is $2\frac{7}{24}$ ft. long; how wide is the second slate?

115. What is the difference in sq. in. between $\frac{3}{4}$ yd. square and $\frac{3}{4}$ sq. yd.?

CUBIC MEASURE.

116. REDUCE 17 cubic yards to cubic inches.

117. Reduce 13 cubic feet to cubic inches.

118. Reduce 15 cord feet to cubic inches.

119. Reduce 68 perches of stone to cubic feet.

120. Change 792 cubic feet of stone to perches.

121. Change 19008 cubic inches to cubic feet.

122. How many cubic yards in 2619 cubic feet?

123. Allowing 231 cubic inches to the gallon, how many gallons will a tank contain whose capacity is 1470 cubic feet?

124. If one cubic foot of lead weighs 711 lb., what is the weight of 4 cubic yards?

125. A pile of wood, containing 16000 cubic feet, was sold at $5.50 a cord; what sum was received for it?

126. At 83 cents a perch, what is the cost of 1188 cubic feet of stone?

127. What will it cost to remove 729 cubic feet of earth, at 55 cents a cubic yard?

TIME.

128. How many seconds in 80 years of 365 days each?

129. Reduce 15 years 16 days to hours.

130. Reduce 11 months 12 days and 17 hours to minutes.

131. Change 183600 seconds to days.

132. Change 236800 minutes to days.

133. Change 50400 hours to years.

134. How many seconds in the year 1900? In July, August, and June?

135. At the rate of 40 miles an hour, in how many days will a locomotive go 7000 miles?

136. If light travels 195000 miles in a second, how many hours will it take it to come from a planet 2760000000 miles distant?

CIRCULAR MEASURE.

137. REDUCE 65° 47′ to seconds.

138. Reduce 78° 33′ to minutes.

139. One quarter of a circumference equals how many minutes?

140. How many minutes in 1080″?

141. How many degrees in 75600″?

142. How many degrees in 1440′?

143. 1710″ is what part of a circle?

144. How many seconds in $\frac{7}{8}$ of a circumference?

145. If the circumference of the earth is 25000 miles, what is the length of 6 degrees?

146. What is the length of 47′ on the equator?

147. What is the length of 1″ on the equator?

148. What is the length of a quadrant, if a degree is $69\frac{1}{2}$ miles?

MISCELLANEOUS MEASURES.

149. How many units in 480 score?

150. How many dozen eggs, at 2 cents apiece, can be bought for $14.40?

151. How many score in 270 dozen?

152. How many dozen screws will it take to fasten 460 bolts, if each bolt needs 6 screws?

153. How many sheets in 600 reams?

154. If 6 gross of pens were divided among 27 boys, how many did each receive?

155. At the rate of $6\frac{1}{4}$ cents per dozen, what is the cost of $12\frac{1}{2}$ gross of buttons?

156. How many reams of paper will be needed to print twenty thousand copies of a book, if each sheet makes 8 leaves, and the book contains 150 pages?

157. What is the cost of $121\frac{1}{2}$ gross of books, if ten score cost $37.50?

COMPOUND ADDITION.

158. ADD £17 5 s. 2 far.; £18 17 s. 8 d.; £29 11 d. 3 far.

159. Add £211 15 s. 6 d.; £192 10 d. 1 far.; £18 10 s. 3 far.; £20 17 s. 5 d. 3 far.

160. Add 212 T. 17 cwt. 78 lb. 10 oz.; 180 T. 11 cwt. 15 oz.; 692 T. 17 cwt. 86 lb. 14 oz.; 73 T. 11 cwt. 18 lb.

161. Add 613 T. 19 cwt. 98 lb.; 109 T. 98 lb. 6 oz.; 68 T. 19 cwt. 86 lb. 10 oz.; 284 T. 17 cwt. 79 lb. 14 oz.

162. Add 6 lb. 7 oz. 14 pwt.; 18 lb. 12 pwt. 11 gr.; 17 lb. 8 oz. 12 pwt. 23 gr.; 11 lb. 11 oz. 16 gr.

163. Add 13 lb. 23 gr.; 11 oz. 12 pwt. 14 gr.; 16 lb. 11 oz. 17 pwt. 21 gr.; 29 lb. 7 oz. 19 pwt.

164. Add 3 ℔ ℥ 17 gr.; 14 ℔ ʒ ʒ ℈; 19 ℔ ʒ ℥; 23 ℔ ℥ ʒ ℈ ℈.

165. Add 13 ℔ ʒ ʒ ℈ 17 gr.; 17 ℔ ℥ ℈ 17 gr.; 26 ℔ ʒ ℥ ℈ 15 gr.; 24 ℔ ʒ ℥ ℥ 19 gr.

166. Add 1 bu. 7 qt. 1 pt.; 17 bu. 3 qt.; 12 bu. 5 qt. 1 pt.; 6 bu. 3 pk. 1 pt.; 15 bu. 3 pk. 1 qt.

167. Add 16 bu. 3 pk. 1 pt.; 23 bu. 2 pk. 7 qt.; 19 bu. 2 pk. 1 pt.; 21 bu. 2 pk. 6 qt. 1 pt.

168. Add 16 gal. 3 pt. 3 gi.; 15 gal. 2 qt. 1 pt. 2 gi.; 19 gal. 3 qt. 1 pt. 1 gi.

169. Add 63 gal. 2 qt. 1 pt.; 16 gal. 1 pt. 3 gi.; 17 gal. 2 qt.

170. Add 1 mi. 311 rd. 4 yd. 2 ft. 11 in.; 6 mi. 3 yd. 2 ft. 10 in.; 17 mi. 127 rd. 1 ft. 9 in.; 111 rd. 3 yd. 6 in.

171. Add 16 sq. mi. 346 A. 17 sq. yd. 89 sq. in.; 19 sq. mi. 11 A. 158 sq. rd. 28 sq. yd. 7 sq. ft. 117 sq. in.; 11 sq. mi. 108 sq. rd. 6 sq. ft. 109 sq. in.

172. Add 16 cu. yd. 19 cu. ft. 1000 cu. in.; 25 cu. yd. 18 cu. ft. 800 cu. in.

173. Add 1 yr. 6 mo. 22 da.; 6 yr. 5 mo. 19 da. 39 sec.; 6 mo. 23 hr. 46 min.; 28 da. 11 hr. 53 min. 58 sec.

174. Add 76° 14′ 39″; 86° 50′; 79° 46″; 87° 38′ 48″.

175. Add 32 cd. 17 cu. ft.; 124 cd. 119 cu. ft.

COMPOUND SUBTRACTION.

176. From £26 17 s. 11 d. 2 far. take £19 18 s. 3 far.

177. From £211 5 d. take £192 16 s. 7 d. 3 far.

178. From 175 T. 2 cwt. 98 lb. take 160 T. 18 cwt. 6 oz.

179. From 114 T. take 98 T. 17 cwt. 96 lb. 15 oz.

180. From 6 lb. 4 oz. 13 pwt. take 5 lb. 11 oz. 16 gr.

181. From 17 lb. 10 gr. take 15 lb. 6 oz. 18 pwt. 19 gr.

182. From 11 ℔ 5℥ 6℥ 1℈ take 4 ℔ 6℥ 7℥ 2℈ 12 gr.

183. From 6 mi. take 5 mi. 319 rd. 5 yd. 1. ft. 3 in.

184. From 4 ℔ 5℥ take 2 ℔ 11℥ 7℥ 2℈ 17 gr.

185. From 7 mi. 165 rd. 1 yd. 6 in. take 6 mi. 2 yd. 2 ft. 9 in.

186. From 5 mi. 2 ft. 7 in. take 4 mi. 79 rd. 4 yd. 2 ft. 11 in.

187. From 16 sq. mi. 1 A. take 11 sq. mi. 613 A. 157 sq. rd.

188. From 1 sq. mi. take 617 A. 158 sq. rd. 28 sq. yd. 132 sq. in.

189. From 12 cords take 16 cu. yd. 19 cu. ft. 1600 cu. in.

190. From a cask containing 31½ gallons, 15 gal. 2 qt. 1 pt. were sold; how much remained?

191. 16 bu. 3 pk. 6 qt. of peaches were divided between two families; if the first family took 9 bu. 2 pk. 6 qt. 1 pt., how many were left for the second?

192. How many hours are left in a leap year after 11 P. M. on the 14th of July?

193. From 36 A. take 35 A. 159 sq. rd. 30 sq. yd. 2 sq. ft. 29 sq. in.

194. What is the difference in longitude between two places, one of which is 17° 19′ 35″ west of Washington, and the other 179° 35′ 59″ west of the same city?

195. What is the difference between 471 cu. yd. 16 cu. ft. 972 cu. in. and 5 cu. yd. 17 cu. ft. 1710 cu. in.?

196. A note dated Feb. 28, 1878, was paid Aug. 27, 1879; how long did it run?

197. A druggist sold 6℥ 3℥ 5℈ of quinine to one man, and 7℥ 5℥ 15 gr. to another; how much had he left out of 1 ℔ 6℥?

COMPOUND MULTIPLICATION.

198. MULTIPLY £611 15 s. 6 d. 2 far. by 17.

199. 16 men received £2 6 s. 6 d. apiece; how much did all receive?

200. If one tablespoon weighs 1 oz. 16 pwt. 18 gr., what will be the weight of two dozen tablespoons?

201. If one horse weighs 9 cwt. 76 lb. 7 oz., what will 13 such horses weigh?

202. If a family use 2 qt. 1 pt. of milk per day, what will they use in a year?

203. A druggist sells 6ʒ 5ʒ 2ϑ 15 gr. of laudanum each day; how much will he sell in 13 days?

204. Each side of a square field is 100 rd. 4 yd. 2 ft. 10 in.; what is the distance round it?

205. A man can walk 4 mi. 75 rd. 4 yd. per hour; how far will he walk in 6 days, if he walks 11 hours each day?

206. A wine-dealer bought 7 barrels of wine, each containing 31 gal. 3 qt. 1 pt. 2 gi.; what did they all contain?

207. If one apple tree yields 14 bu. 3 pk. 7 qt. of fruit, how much will 40 trees yield, at the same rate?

208. If one field contains 13 A. 120 sq. rd. 25 sq. yd., what will 11 such fields contain?

209. A man has 16 piles of wood, each containing 14 cu. yd. 16 cu. ft. 1600 cu. in.; what do all contain?

210. If a barrel contains 3 cu. ft. 650 cu. in., how much flour in 16 such barrels?

211. How many gallons will 12 of the above barrels contain, if 231 cu. in. make a gallon?

212. How many bushels of oats will a bin capable of holding a cord of wood contain, if $2150\frac{42}{100}$ inches make a bushel?

213. How many cubic feet in a pile of wood 18 ft. long, 8 ft. wide, and 8 ft. high?

214. How many gallons of wine in 18 barrels, each containing 31 gal. 2 qt. 1 pt.?

COMPOUND DIVISION.

215. £14 12 s. 6 d. ÷ 3.

216. £264 10 s. 8 d. 3 far. ÷ 25.

217. 61 T. 15 cwt. 98 lb. ÷ 36.

218. 16℔ 10℥ 6℥ 2℈ 16 gr. ÷ 24.

219. 202 bu. 7 qt. 1 pt. ÷ 6.

220. 3850 A. 40 sq. rd. 87 sq. in. ÷ 55.

221. If 6 bins hold 22 T. 10 cwt. 60 lb. of coal, what will 1 bin hold?

222. If an orchard of 42 trees bore 560 bu. 2 pk. of fruit, how much was that, on an average, for each tree?

223. If a vessel sails 63° 16′ 45″ in 12 days, how far will it sail in a day?

224. If a druggist uses 6℥ 2℥ 2℈ 5 gr. of bromide of potassium in 200 prescriptions, how much is there, on an average, in each prescription?

225. If 124 bottles hold 6 gal. 2 qt. 1 pt., how much will one bottle hold?

226. A farmer has 26 fields, containing 278 A. 112 sq. rd. 13 sq. yd.; what is the area of each, if they are all equal?

227. A dozen boxes of a certain size will hold a cord of wood; how many bushels of corn will each box hold?

228. If 1 cubic foot 516 cubic inches of iron weigh 580 lb., what will 13 cu. yd. 16 cu. ft. 432 cu. in. weigh?

229. How many cubic feet of water are there in a cistern holding 119 barrels, allowing 31½ gallons to the barrel, and 231 cu. in. to the gallon?

230. If 1 A. 108 sq. rd. 22 sq. yd. cost $12.50, how much land can be bought for $1675?

231. If a ship sails 12 mi. 240 rd. 2¾ yd. in an hour, in how many hours will she sail 204 mi. 8 rd.?

232. If a hogshead of sugar weighs 15 cwt. 50 lb. 15 oz., how many hogsheads are there in 12 T. 10 cwt. 5 oz.?

233. If a yard of velvet costs 9 s. 6 d., how many yards can I buy for £153?

LONGITUDE AND TIME.

CASE I.

234. WHAT is the difference in time between Augusta, Maine, longitude 69° 50′ west, and San Francisco, 122° 26′ 15″ west?

235. What is the difference in time between Columbia, S. C., longitude 81° 7′ west, and Havre, 6′ 9″ east?

236. What is the difference in time between New Orleans, longitude 90° 7′ west, and Rome, 12° 27′ 14″ east?

237. What is the difference in time between Cairo, longitude 32° 15′ 36″ east, and Pekin, 116° 28′ 54″ east?

238. What is the difference in time between two places, one 16° 21′ 42″ east longitude, and the other 84° 18″ west longitude?

CASE II.

239. When it is noon at one place, it is 9 hr. 45 min. 12 sec. A. M. at another. What is the difference in longitude between the two places?

240. When it is 9 hr. 45 min. 15 sec. A. M. at A's home, it is 3 hr. 15 min. 30 sec. A. M. at B's. What is the difference in longitude between their homes?

241. If the difference in time between two places is 5 hr. 16 min. 27 sec., what is their difference in longitude?

242. A man starts from a place whose longitude is 9° 36′ east from Washington, and traveling due west 6° 24′, reaches St. Paul. What is the longitude of St. Paul, reckoned from Greenwich, which is 77° east from Washington?

243. What is the difference in longitude between two places whose difference in time is 11 hr. 14 min. 16 sec.?

244. What is the difference in longitude between two places whose difference in time is 7 hr. 5 min. 13 sec.?

245. What is the difference in longitude between two places, if when it is 12 P. M. at one place it is 6 hr. 45 min. A. M. of the next day at the other place?

DECIMAL FRACTIONS.

READ or write in words the following:

1. .0105; .000125; 1.001105; 22.000022.
2. .006103; 100.1001; 1000.0001; 894.004708; 176.176.
3. .001007; 25.025; 617.0617; 61.1001; 99.000009.
4. 1.006; .000007; 7000.0007; .007060501; 4.00088.
5. 160.042; 3131.003131; .00100017; 617000.0016.
6. 119.00702; .10004; .0725; 190.901109; 375000.0375.
7. 914.5061; .23405; 89.00089; 200.002; 1900.009.
8. 71.0000101; 47.0007; 2.000005; 1061.061; 1700.029.
9. 86.0072; 80.00805; 10.1004; 960.04; 1843.0008.
10. 75.0034; 25.2506; 3.1416; .096004; 700.007.
11. 860.06005; .7854; .07958; .00006; 600.006.
12. 798.0065349; .5236; .31831; .0606; 7000.007.
13. 602.2066021; 1.4141; 13.0013; 823.265; .00009.
14. 719.503217; .00008; 1.20004; 800.075; .0875.

Write in figures the following:

15. Seventeen hundredths.
16. Twenty-four ten-thousandths.
17. Six hundred and two hundred-millionths.
18. Five thousand and seventy-six billionths.
19. Seventy-nine, and fifty-three thousandths.
20. Nine thousand five hundred and sixty-one, and seven thousand six hundred and two millionths.
21. Fifty-six, and twenty one millionths.
22. Nineteen thousand and sixteen trillionths.
23. Eighty thousand, and eight thousandths.
24. Eight hundred and six ten-thousandths.
25. One hundred, and one hundredth.
26. Sixteen, and seven thousand and two millionths.
27. One hundred, and nine hundredths.
28. Six hundred, and sixteen hundredths.

ADDITION.

29. ADD 61.027, 64.3006, 7.986071, 832.026, 610.016.

30. Add 70.07, 710.0604, 60.90906, 1.0005, 630.0036.

31. Add .006106, 901.00753, 7080.085, 60.431506, 7.009.

32. Add 34.056, 7.90805, 91.064205, 762.349, 60.0605, .9124.

33. Add 380.906, 78.0421, 50.60032, 10.00001, 68.5407, 81.02.

34. Add 7.90907, 43.00206, 600.006, 119.0652, .91075, .641.

35. Add 906.0501, .00206, 10.0705, 500.606, .00210064, 1.7512.

36. Add 61.2095, 7.94613, 6.004023, .7121418, 610.0106, 9.0209.

37. Add 7.90426, 90.20209, .004105, 165.4297, 104.401, 7.2281.

38. Add 98.64321, .805431, 7.604321, 79.432506, 10.6066, .9121.

39. Add 62.4056, 1.04712, .007291, 86.41206, 21.34068, 1.1086.

40. Add 71.001072, .0003056, 1.05501, 6804.0408063216.

41. Add 96.08732, 106.06023, 210.77094, 21.096, 6.91075.

42. Add 19.854326, 610.7428906, 6.02020481, 163.4567809.

43. Add 20.077002, 610.77234, 1.0909874, 95.42623425.

44. Add 509.632506, 79.6543201, 80.420608, 72.3418142.

45. Add 10.402068, 246.80105, 64.70903, .000109, 10.806435.

46. Add 2.146358, .00719204, 17.9320465, 246.801030472.

47. 617.234 + 796.005 + 73.920604 + 980.6432045.

48. 71.8064 + 491.27436 + 69.106085 + 806.0473205.

49. 311.04602 + 109.705342 + .006841 + 70.956043.

50. 708.564802 + 912.604075 + 8.64207089 + 392.752.

51. Add seven hundred, and nineteen thousandths; seven hundred and nineteen thousandths; two hundred and one millionths; and two hundred, and one millionth.

52. Add sixteen dollars and six cents, two hundred dollars and thirty-nine cents, and seventy-nine dollars and nine cents.

53. Add $711.265, $296.061, $495.8061, $714.268, $42.25.

SUBTRACTION.

54. From 64.201 take 17.6942.

55. From 906.2704 take 2.409061.

56. From 72.9465 take 18.607321.

57. From 604.217 take 586.90975.

58. From 17.902 take 4.44444.

59. From 294.01 take .873654.

60. From 16 take .016.

61. Subtract 19.40621 from 20.71243.

62. Subtract 12.648 from 901.40206.

63. Subtract 21.52996 from 215.006.

64. Subtract 10.0127 from 20.6143.

65. Subtract 198.618459 from 268.7102613.

66. Subtract 93.614217 from 100.001.

67. Subtract 84.30706 from 91.36305.

68. Subtract 7316.504087 from 7321.0102312.

69. 201.102 – 196.51237 = how many?

70. 106.63214 – 18.2978346 = how many?

71. 21.7329 – 12.369284 = how many?

72. 91.39040 – 5.61827 = how many?

73. 111.90206 – 21.0605942 = how many?

74. 11.61203 – 9.235764 = how many?

75. 714.62809 – 1.9253786 = how many?

76. From one take ninety-nine thousandths.

77. From two hundred and seventeen take two hundred and seventeen thousandths.

78. Take twenty-five and nine hundred and ninety-nine thousandths from twenty-seven.

79. Take six hundred ninety-five thousandths from six and ninety-five millionths.

80. Take five hundred and twelve ten-thousandths from five and twelve thousandths.

81. From one hundred take one-hundredth.

82. From nine hundred, and sixteen thousandths, take nine hundred and sixteen thousandths.

MULTIPLICATION.

83. MULTIPLY 126.5 by 21; .0025 by 1.005.

84. Multiply 21.752 by 116; 9.012 by .9012.

85. Multiply 46.057 by 55; 18.001 by 1.8001.

86. Multiply 719.2468 by 65; 34.11025 by 1000.

87. Multiply 61.93 by 10.5; 250.009 by 3.00002.

88. Multiply 794.302 by 6.8; .00009 by .0915.

89. Multiply 94.6085 by .732; .04132 by 1000.2.

90. Multiply 406.32 by .005; 18000.8 by .000001.

91. Multiply 81.729503 by 6.006; 60.005 by 6.0005.

92. Multiply 6192.468 by 73.21648; .9002 by 9002.

93. Multiply 735.2604 by 90.065; 127000 by .0127.

94. Multiply 52.168047 by 180.64; 19.011 by 10.301.

95. 613.217 × 25 = how many? .002 × .02 = what?

96. 81.9426 × 1.205 = how many? 1.3 × 1.0003 = what?

97. 5184.906 × 64 = how many? 100 × .0005 = what?

98. 60.04 × 7.025 = how many? 150.5 × .152 = what?

99. .71298 × .0398 = how many? 11.1 × .00005 = what?

100. 1.0005 × 6.721 = how many? .00005 × 500 = what?

101. 6124 × .4983 = how many? 17000 × .0017 = what?

102. 178.64501 × 61.75 = how many? 5.05 × 110.3 = what?

103. 4.80653 × 3200 = how many? 1000 × .001 = what?

104. 80.60975 × 7.108 = how many? .0003 × .0003 = what?

105. 792.4681 × 6.4307 = how many? 25.03 × 250.3 = what?

106. 3057.968 × .7195 = how many? 810.001 × .081 = what?

107. Multiply one hundred, and twenty-five hundredths, by one and forty-eight hundredths.

108. Multiply one thousand by six hundred and fifteen ten-thousandths.

109. Multiply one, and five ten-thousandths, by one hundred and five thousand, and seven hundred and seventy-four millionths.

110. Multiply one thousand hundredths by one hundred thousandths.

111. Multiply ten thousand by ten thousandths.

DIVISION.

112. DIVIDE 10.515 by 1.5; 105.15 by .15.

113. Divide 604.4061 by 1.23; 60.44061 by 123.

114. Divide 7.1205 by 1.05; .71205 by 10.5.

115. Divide .69384 by 1.06; 69.384 by .106.

116. Divide 273.291 by 6.15; .273291 by 61.5.

117. Divide 709.851 by 60.231; 70985.1 by .60231.

118. Divide 860.402 by .1124; 86.0402 by .0424.

119. Divide 579975 by 1.515; 57.9975 by 151.5.

120. Divide 600 by .06; 600 by .00006.

121. Divide .17525 by .025; 17.525 by .2500.

122. Divide 62.5065 by 12.505; 62506.25 by .12505.

123. 712.648 ÷ 6.24 = what? .712648 ÷ 624 = what?

124. .00625 ÷ .025 = what? .625 ÷ 2.5 = what?

125. 24.6905 ÷ 16.005 = what? 246.905 ÷ 1600.5 = what?

126. 43.680907 ÷ 7.0913 = what? 25.001 ÷ .25001 = what?

127. 204.60859 ÷ 50.63222 = what? 5000 ÷ .0005 = what?

128. 30.75021 ÷ .75 = what? 307502.1 ÷ .75 = what?

129. .719856 ÷ .009 = what? 719.856 ÷ .0009 = what?

130. 632.1904 ÷ 46.05 = what? 63.21904 ÷ .4605 = what?

131. 4.31256 ÷ 1.23 = what? 431256 ÷ .0123 = what?

132. 869.87412 ÷ 31.401 = what? 7.007 ÷ 700.7 = what?

133. 5.0505 ÷ 10.101 = what? 5050.5 ÷ .10101 = what?

134. Divide six and twenty-five hundredths by two and five tenths.

135. Divide ninety and nine tenths by four and ninety-five hundredths.

136. Divide one hundred by three and one hundred and twenty-five thousandths.

137. Divide six hundred and twenty thousand and five hundred and twenty-five ten-thousandths by three and one hundred and twenty-five thousandths.

138. Divide six hundred and ten thousandths by six hundred, and ten thousandths.

139. Divide one thousandth by one thousand.

REDUCTION.

CASE I.

140. Express 3.15 as a common fraction.
141. Express 6.25 as a common fraction.
142. Express .005 as a common fraction.
143. Express 1.0375 as a common fraction.
144. Express .7645 as a common fraction.
145. Express 21.325 as a common fraction.
146. Express .342 as a common fraction.
147. Express 6.12 as a common fraction.
148. Express .9125 as a common fraction.
149. Express 6.2148 as a common fraction.
150. Express .0715 as a common fraction.
151. Express 10.535 as a common fraction.
152. Express .666$\frac{2}{3}$ as a common fraction.
153. Express .466$\frac{2}{3}$ as a common fraction.
154. Change \$.66$\frac{2}{3}$ to the fraction of a dollar.
155. Change \$.05 to the fraction of a dollar.
156. What part of \$6 is \$.755?
157. What part of \$12 is \$.625?
158. What part of a ton is 6.66$\frac{2}{3}$ cwt.?
159. What common fraction does .12$\frac{1}{2}$ equal?
160. Change .06$\frac{1}{4}$ to a common fraction.
161. Change .07$\frac{1}{7}$ to a common fraction.
162. Change .06$\frac{2}{3}$ to a common fraction.
163. What common fraction equals .05$\frac{5}{19}$?
164. What common fraction equals .375?
165. What common fraction equals .07$\frac{9}{18}$?
166. What common fraction equals .6875?
167. What common fraction of a dollar is \$.33$\frac{1}{3}$?
168. Change 1.18$\frac{3}{4}$ to an improper fraction.
169. Change 2.006$\frac{1}{4}$ to an improper fraction.
170. Change .007$\frac{2}{9}$ to a common fraction.
171. Change .0$\frac{5}{8}$ to a common fraction.
172. Change 33.0$\frac{1}{3}$ to an improper fraction.

CASE II.

173. Express $\frac{3}{5}$ as a decimal.

174. Express $\frac{1}{16}$ as a decimal.

175. Change $\frac{1}{20}$, $\frac{1}{40}$, $\frac{1}{25}$, to decimals, and add them.

176. Express $\frac{21}{75}$ as a decimal.

177. Express $\frac{31}{32}$ as a decimal.

178. Subtract $\frac{11}{16}$ from $\frac{53}{64}$, and change the result to a decimal.

179. Express $\frac{3041}{8000}$ as a decimal.

180. Change $\frac{435}{2000}$ to a decimal.

181. Multiply $\frac{6}{12}$ by $\frac{5}{8}$, and change the result to a decimal.

182. Express $\frac{29}{256}$ as a decimal.

183. Express $\frac{301}{512}$ as a decimal.

184. $\frac{6085}{1600} \div \frac{201}{256}$ = what decimal?

185. Express $\frac{21}{96}$ as a decimal.

186. Change $\frac{137}{200}$ to a decimal.

187. Add $\frac{6}{11}$, $\frac{2}{7}$, and $\frac{3}{4}$, and change the sum to a decimal.

188. Express $\frac{61}{32}$ as a decimal.

189. Change $\frac{15}{16}$ to a decimal.

190. Change the difference between $\frac{17}{32}$ and $\frac{5}{12}$ to a decimal.

191. Express $\frac{29}{80}$ as a decimal.

192. Express $\frac{18}{40}$ as a decimal.

193. Multiply $\frac{6}{7}$ by $\frac{5}{8}$, and change the result to a decimal.

194. Express $\frac{71}{144}$ as a decimal.

195. What decimal does $\frac{11}{15}$ equal?

196. What decimal does $\frac{18}{25}$ equal?

197. $\frac{12}{35} \div \frac{16}{175}$ = what decimal?

198. Divide $\frac{2}{8}$ by $\frac{1}{15}$ and express the quotient as a decimal.

199. Express the sum of $\frac{2}{8}$, $\frac{3}{5}$, $\frac{5}{8}$, and $\frac{7}{12}$ as a decimal.

200. Subtract $\frac{19}{32}$ from $\frac{209}{256}$, and express the result as a decimal.

201. Divide $160\frac{7}{8}$ by $55\frac{11}{16}$ in common fractions and in decimals, and show that the result is the same in both.

202. Change $\frac{19}{32}$ to the form of a decimal, and multiply it by .035.

203. The sum of three numbers is $18\frac{3}{4}$, and two of the numbers are $7\frac{1}{5}$ and 3.001; what is the other?

DENOMINATE FRACTIONS.

CASE I.

1. REDUCE $\frac{17}{860}$ of a mile to the decimal of a rod.

2. Reduce $\frac{1}{1740}$ of a ton to the decimal of a pound.

3. Change $\frac{1}{100}$ of a lb. to the decimal of a pwt.

4. Change .006 of an acre to the decimal of a sq. rd

5. What decimal of a ℥ is $\frac{1}{60}$ of a ℔?

6. What decimal of a dime is $\frac{13}{200}$ of an eagle?

7. Reduce $\frac{1}{240}$ of a cord to the decimal of a cu. ft.

8. Reduce $\frac{11}{6000}$ of a degree to the decimal of a second

9. Change $\frac{1}{80000}$ of a day to the decimal of a minute.

10. Change $\frac{1}{50}$ of a gross to the decimal of a dozen.

11. What decimal of a yard is $\frac{1}{60000}$ of a league?

12. What decimal of a pint is $\frac{21}{1600}$ of a bushel?

13. Reduce $\frac{1}{50}$ of a gallon to the decimal of a pint.

14. Reduce $\frac{1}{3000}$ of a sq. mi. to the decimal of a sq. rd.

15. Change $\frac{1}{1600}$ of a ℔ to the decimal of a scruple.

16. Change $\frac{1}{9600}$ of a lb. to the decimal of a grain (Troy weight).

17. What decimal of an ounce is .000625 of a ton?

18. Change .0523 gallon to the decimal of a pint?

19. Reduce .0025 bushel to the decimal of a pint.

20. What decimal of a second is $\frac{11}{86000}$ of a day?

21. Reduce $\frac{68}{1900}$ of a cu. yd. to the decimal of a cu. ft.

22. Change $\frac{1221}{360000}$ of a degree to the decimal of a second.

23. What decimal of an inch is $\frac{1}{178000}$ of a mile?

24. Change $\frac{17}{2560}$ of a ℔ to the decimal of a drachm.

25. Reduce $\frac{1}{5000}$ of a ton to the decimal of a lb.

26. What decimal of a grain is $\frac{11}{960}$ of an ounce? (Troy weight).

CASE II.

27. Change $\frac{8}{5}$ of a foot to the decimal of a rod.

28. Change $\frac{7}{8}$ lb. to the decimal of a ton.

29. What decimal of a ℔ is 2 scruples?

30. What decimal of a lb. is 12 gr.? (Troy weight).

31. What decimal of a cubic yard is 432 cu. in.?

32. Change 80 sq. rd. to the decimal of a sq. mi.

33. Change 3 gills to the decimal of a gallon.

34. Change 1 pint to the decimal of a bushel.

35. What decimal of a gross is $\frac{1}{2}$ a score?

36. What decimal of a £ is 3 d.?

37. Change $\frac{3}{5}$ of a cent to the decimal of an eagle.

38. Change $\frac{21}{60}$ of a second to the decimal of a day.

39. What part of a ton is $\frac{15}{65}$ lb.?

40. Change $\frac{1}{5}$ of an inch to the decimal of a rod.

41. What decimal part of a ℥ is 2 scruples?

42. What decimal of a cord is 612 cu. in.?

43. Change $\frac{20}{45}$ grain to the decimal of an ounce (Troy weight).

44. Change $\frac{1}{3}$ of a gallon to the decimal of a barrel ($31\frac{1}{2}$ gal.).

45. Change $\frac{1}{6}$ of a pint to the decimal of a bushel.

46. What decimal of an entire circumference is 30″?

47. What decimal of a ton is $\frac{3}{5}$ of a cwt.?

48. Change $\frac{4}{5}$ of an ounce to the decimal of a lb. Troy.

49. What decimal of a £ is $\frac{3}{4}$ of a far.?

50. What decimal of a sq. rd. is $\frac{2}{5}$ of a sq. ft.?

51. Change 14 inches to the decimal of a rod.

52. Change $\frac{3}{16}$ of a second to the decimal of an hour.

53. Change $\frac{8}{8}$ of a yard to the decimal of a mile.

54. What decimal of a double eagle is $2\frac{1}{2}$ dimes?

55. What decimal of a degree is $55\frac{1}{2}$ minutes?

56. What part of a square rod is $3\frac{1}{4}$ yards?

57. What decimal of an acre is $7_{1}\frac{5}{2}$ square feet?

58. What decimal of a cord is $9_{14}\frac{7}{4}$ cu. ft.?

59. What decimal of a mile is an inch?

CASE III.

60. Reduce $\frac{8}{11}$ of a mile to lower denominations.

61. Change $\frac{5}{6}$ of a ton to pounds and ounces.

62. Change $\frac{15}{8}$ of a gallon to lower denominations.

63. What is the value of $\frac{7}{24}$ of a bushel in pints?

64. What is the value in cubic inches of $\frac{3}{18}$ of a cu. yd.?

65. Reduce $\frac{7}{11}$ of a sq. mi. to lower denominations.

66. Reduce $\frac{19}{18}$ of a pound to scruples.

67. Change $\frac{3}{5}$ of a £ to farthings.

68. Express $\frac{5}{4}$ yd. square in sq. ft. and sq. inches.

69. Add $\frac{3}{8}$ of a mi., $\frac{4}{11}$ of a rod, and $\frac{2}{3}$ of a yd.

70. Subtract $\frac{7}{12}$ of an hour from $\frac{21}{96}$ of a day.

71. Add $\frac{2}{5}$ of a ℔, $\frac{3}{4}$ of an ℥, and $\frac{2}{3}$ of a ʒ.

72. From a farm containing 212.50 acres, I sold $56\frac{2}{5}$ acres to one man, and 38.25 acres to another; how many acres and sq. rd. were left?

73. From $\frac{3}{5}$ of a ton of flour $\frac{5}{8}$ of a cwt. was sold; how much was left?

74. A man earned $\frac{3}{4}$ of an eagle one week, $\frac{21}{2}$ of a dollar another week, and $\frac{217}{10}$ of a dime a third; how much did he earn in all?

75. If $\frac{2}{5}$ of a lb. of gold is worth $49.50, what is the value of $\frac{3}{8}$ of a pwt.?

76. Add $\frac{3}{8}$ of a degree, $\frac{1}{4}$ of a minute, and 5.5″.

77. From $\frac{3}{9}$ of a cord take $\frac{7}{12}$ of a cu. yd.

78. What is the sum of $\frac{3}{5}$ ℔, $\frac{15}{12}$ ℥, $\frac{6}{9}$ ʒ, $\frac{2}{3}$ ℈?

79. From $\frac{3}{7}$ of a week take $\frac{13}{144}$ of a day.

80. A man had $\$21\frac{2}{15}$, and lost $\$10\frac{1}{3}$; how many cents had he left?

81. A man had $12\frac{2}{3}$ tons of coal after buying $3\frac{6}{17}$ tons; how many pounds had he at first?

82. Add $\frac{2}{3}$ of a cu. ft., $\frac{11}{16}$ of a cord, and $\frac{12}{18}$ of a cu. yd.

83. From $\frac{3}{8}$ of a £ take $\frac{16}{21}$ of a shilling.

84. What is the sum of $\frac{11}{16}$ of an ounce and $\frac{21}{24}$ of a pwt.?

85. Add $\frac{19}{15}$ of a dollar, $\frac{8}{10}$ of a dime, and $\frac{2}{3}$ of a cent.

86. If $\frac{18}{15}$ of a ton of coal cost $5.72, what cost $\frac{5}{8}$ cwt.?

CASE IV.

87. What part of 1.75 mi. is 200 rd. 2 yd. 6 in.?

88. What fraction of a ton is 12 cwt. 75 lb. 8 oz.?

89. Reduce 6 ʒ 6 ʒ 2 ℈ to the fraction of a ℔.

90. Reduce 4 oz. 12 pwt. 20 gr. to the decimal of an oz.

91. What decimal part of a sq. mi. is 300 A. 80 sq. rd?

92. Reduce 15 hr. 30 min. 30 sec. to the decimal of a day.

93. Reduce 30′ 30″ to the decimal of a degree.

94. Change 5 s. 6 d. to the fraction of a £.

95. What part of 3 cords is 12 cu. ft. 432 cu. in.?

96. What part of 2 pecks 6 qt. is 5 qt. 1 pt. 2 gi.?

97. Reduce 12 gal. 2 qt. to the fraction of 31 gal. 2 qt.

98. Change 13 dozen to the decimal of 6 score.

99. Change 20 rd. 2 yd. 2 ft. to the fraction of 2 mi. 160 rd.

100. Reduce 40 A. 16 sq. rd. to the decimal of 3 sq. mi.

101. What part of a cu. yd. is 3 cu. ft. 228 cu. in.?

102. What part of 2 tons is 19 cwt. 96 lb. 8 oz.?

103. Change 10 oz. 8 pwt. 12 gr. to the decimal of 2 lb. 6 oz.

104. Reduce 8 ʒ 4 ʒ 2 ℈ to the decimal of 10 ʒ.

105. Change 5 gal. 3 qt. 2 gi. to the fraction of 6 gal.

106. What part of $8\frac{3}{8}$ bu. is 3 pk. $6\frac{1}{2}$ qt.?

107. Change $7\frac{1}{2}$ hr. 30 min. 30 sec. to the decimal of $10\frac{3}{4}$ hr.

108. Reduce 17° 30′ 35.5″ to the decimal of 86°.

109. If a man earns $.80 in 3 hr. 20 min., what will he earn in 8 days, if he works 10 hr. a day?

110. 1 T. 10 cwt. 56 lb. of coal cost $9.25, what cost 3 T. 5 cwt. 25 lb., at the same rate?

111. What part of a farm of 60 A. 32 sq. rd. 5 sq. yd. was sold, if there were 15 A. 150 sq. rd. 16 sq. yd. left?

112. If 1 oz. 10 pwt. 12 gr. of silver cost $2.16, what will 5 pwt. 2 gr. cost?

113. What fraction of $6\frac{1}{4}$ feet square is $.6\frac{1}{4}$ square ft.?

114. Add $\frac{8}{8}$ ft. square, $\frac{3}{8\,8}$ sq. rod, and $\frac{5}{9\,9}$ mi. square.

115. From a tract of land $8\frac{1}{3}$ miles square, $8333.33\frac{1}{3}$ acres were sold, and the rest was divided into 520 equal lots; how many acres were there in each lot?

REVIEW PROBLEMS.

MAKE out bills for the following:

1. $6\frac{3}{4}$ tons of hay @ \$19.20 a ton;
   15 bbls. of flour @ \$7.15 a barrel;
   55 bu. of wheat @ 98 cts. a bushel;
   49 bu. of barley @ 75 cts. a bushel.

2. $12\frac{1}{2}$ doz. eggs @ 24 cts. per dozen;
   $\frac{3}{4}$ lb. of pepper @ $3\frac{1}{2}$ cts. per ounce;
   $10\frac{3}{4}$ lbs. of ham @ 18 cts. per pound;
   $6\frac{1}{4}$ lbs. of butter @ 40 cts. per pound;
   $9\frac{1}{2}$ lbs. of cheese @ 14 cts. per pound;
   $16\frac{3}{4}$ lbs. of beef @ 24 cts. per pound.

3. 121 yds. of muslin at $18\frac{1}{2}$ cts. a yard;
   46 yds. of calico at $13\frac{1}{4}$ cts. a yard;
   $4\frac{1}{4}$ doz. handkerchiefs at \$2.40 a dozen;
   9 pairs of gloves at \$1.25 a pair;
   $2\frac{1}{2}$ doz. collars at \$3.30 a dozen.

4. 15 boxes of soap @ \$5.15 per box;
   125 lbs. of sugar @ $9\frac{1}{2}$ cts. per pound;
   25 lbs. of tea @ 95 cts. per pound;
   34 lbs. of coffee @ 32 cts. per pound;
   40 lbs. of rice @ $5\frac{1}{4}$ cts. per pound.

5. 25 yds. of ribbon @ $31\frac{1}{4}$ cts. a yard;
   16 doz. of stockings @ \$1.80 a dozen;
   14 yds. of satin @ \$5.18$\frac{3}{4}$ a yard;
   33 yds. of silk @ \$2.25 a yard;
   12 doz. Coates' thread @ 70 cts. a dozen;
   216 yds. Shaker flannel @ $62\frac{1}{2}$ cts. a yard.

6. 16 yds. of silk at $\$3\frac{1}{2}$ per yard;
   8 yds. of ribbon at 26 cts. per yard;
   12 yds. of cambric at 13 cts. per yard;
   $2\frac{1}{2}$ yds. of silk velvet at $\$4\frac{1}{4}$ per yard;
   18 doz. of buttons at $37\frac{1}{2}$ cts. per dozen.

7. A man walks 1 m. 22 rd. 3 yd. 2 ft. 11 in. in 19 minutes; how many hours will it require for him to walk 23 miles?

8. At 75 cents per hundred, what is the cost of transporting 11 T. 15 cwt. 15 lb. of dry-goods?

9. In 1576 pounds Avoirdupois how many pounds Troy?

10. How many more grains in 15 pounds Avoirdupois than in 15 pounds Troy?

11. A car-load of wheat weighed 18000 pounds; what was its value, at 97 cents per bushel?

12. How many square yards in the walls and ceiling of a room 31 ft. long, 19 ft. wide, and 11 ft. high?

13. A merchant cut $17\frac{5}{8}$ yards from a piece containing $31\frac{1}{4}$ yd.; what is the value of the remnant, at $\$1\frac{7}{8}$ per yard?

14. What is the value of a pile of wood 121 ft. long, $16\frac{1}{2}$ ft. wide, and 14 ft. high, at $\$11\frac{1}{4}$ per cord?

15. How many spoons, each weighing 3 oz. 2 pwt. 12 gr., can be made from 27 lb. 9 oz. 11 pwt. of silver, and how much silver will be left?

16. What will it cost to plaster the ceiling of a room, the walls being 20 ft. by 15 ft., at $87\frac{1}{2}$ cents per square yard?

17. How many yards of paper will it require to cover the walls and ceiling of the room given in the last example, the height of the room being 10 ft. and the width of the paper 30 in.?

18. What will it cost to cut a road through a hill, the depth of the cut being 16 ft., the average width 20 ft., and the length of the road 39 rods 3 yards 2 feet, at 66 cents a cubic yard?

19. A man purchased 25 bushels of chestnuts at $1.75 per bushel, and retailed them at 10 cents a quart, wine measure; how much did he gain, and how many more quarts did he sell than if he had retailed them by dry measure?

20. If it requires 550 rods of fence to inclose a farm, what is the cost of the fence, at the rate of $0.1875 per foot?

21. Divide $625.75 by $125.15, and multiply the result by .005.

22. Find the sum of 17 ten-millionths, 17 ten-thousandths, 17 hundredths, and 17.

23. 19.1104 × .00015 = how many? .00404 × .000102 = what?

24. Change $.493\frac{7}{18}$ to a common fraction.

25. Change $\frac{1}{7}$ to the form of a decimal.

26. If a horse travels 27086.94 miles in a year of $365\frac{1}{4}$ days, how far does he travel in .875 of a day?

27. Divide nine hundredths by twelve ten-thousandths, and diminish the quotient by one-tenth.

28. Multiply 4.37 by 4 thousandths, and divide the product by .003.

29. Divide 1000.2 by 3 thousandths, and then subtract .0000007.

30. (1256 × 14 ten-millionths + 9.114) ÷ 3 hundredths = what?

31. Divide 1115 by $.033\frac{1}{3}$, and from the quotient subtract 115 ten-millionths.

32. A certain number divided by 3.3 and then multiplied by 1.75 produces 1; what is the number?

33. What number is that from which, if 30.125 be subtracted, .111 of the remainder will be 15?

34. There are two numbers whose sum is 3.7 and whose difference is $\frac{1}{4}$; what are the numbers?

35. Add eleven ten-thousandths, 9 and six millionths, 4 and twenty-nine hundred-millionths, 315 and thirty-seven hundredths, and subtract $17\frac{7}{16}$ from the sum.

36. Change $\frac{9\frac{1}{8}}{12\frac{1}{2}}$ to a decimal fraction, and multiply it by $1\frac{1}{9}$.

37. What number multiplied by 9 equals $1\frac{1}{7} + 2.1 + \frac{1}{4} + \frac{2}{5} + 1.01$?

38. Find the quotient of $(2 - \frac{1}{8}$ of $\frac{1}{9}$ of $\frac{8}{7}) \div 4.3$.

39. $5.143 \div \frac{3}{8}$ of 15 = what? $\frac{3}{8}$ of $.15 \div 5.143$ = how many?

40. If 3.25 acres produce 12.15 tons of hay, how many tons will 13 acres produce?

41. What is the cost of 6.875 bales of cotton, each bale weighing 4.125 cwt., at $12\frac{1}{8}$ cents per pound?

42. Bought 17 cwt. 98 lb. of coffee, at $31\frac{1}{4}$ cents per lb.,

and paid for it with wood at $7.25 per cord; how many cords did it require to pay for the coffee?

43. What part of 1.25 mi. is 17.1 rd. 2.5 yd. 5.25 in.?

44. Change 1.25 s. to the decimal of a £.

45. If 5 T. 10 cwt. 25 lb. of coal (long tons) cost $31.25, what cost 17 T. 17 cwt. 17 lb. at the same rate?

46. What is the value of .1⅓ cubic yards of silver ore, at $0.001 per cubic inch?

47. What decimal part of a square rod is 17.5 sq. yd. 7¼ sq. ft. 11 sq. in.?

48. What is the value of .893 of a year (365 days) in weeks, days, hours, minutes, and seconds?

49. What is the difference between 2¼ square yards and 2.25 yards square?

50. When £128 6 s. 6 d. are paid for .625 of a bale of cloth, what is the value of the whole bale?

51. What are the contents of a pile of wood, in cords, the length being 22.75 ft., the width 6.75 ft., and the height 12.5 ft.?

52. Bought a piece of land 7½ rods square for $15.10 per sq. rd., and sold it for 16¼ cents per square foot; how much did I gain by the sale?

53. Gave $256.50 for 35.25 tons of coal; what should I give for 64.2 tons, at the same rate?

54. If .6 of a cord of wood cost ⅘ as much as a ton of coal, how many tons of coal are equal in value to 5¼ cords of wood?

55. If 18.75 bushels of apples cost $35.75, and the apples are retailed at 30 cents a half-peck, what is the whole gain?

56. What is the cost of papering a room 28 ft. by 23 ft., and 14 ft. 8 in. high, with paper costing $1.25 a piece, each piece 8¼ yd. long and 16 in. wide, no allowance being made for windows or doors?

57. What would be the number of pieces required to paper the room mentioned in the last example, allowing 135 sq. ft. for doors and windows?

58. A man finds, after he has traveled for several days, that his watch has lost 3 hr. 15 min. 20 sec. How many degrees of longitude has he traveled over, and in what direction has he been traveling?

59. A boat sailed .33⅓ of a certain distance, and then returned to the starting-point; it then sailed .66⅔ of the distance, and again returned; finally, it completed the whole distance, which was 3 mi. 75 rd. 5.25 yd.; how far did the boat sail in all?

60. A druggist bought 1125 lb. of drugs, and, by mistake, the drugs were retailed by means of the weights used in mixing medicines; how many pounds did he sell?

61. Bought 23 T. 117 lb. (long tons) of steel at 6.25 cents per pound, and sold it by the ton at such a price that his gain was $1117.77; at what price per ton did he sell the steel?

62. My gain on the sale of a certain quantity of flour was $771.75; how many barrels did I sell if my gain was 2.25 cents per pound?

63. If a family can use 1 T. 7 cwt. 15 lb. 11 oz. of sugar in 5.25 years, how much will it require to last them 1⅞ years?

64. If a coal-boat is carried at the rate of 2 mi. 187.875 rd. in an hour by the current of the Mississippi River, how long will it require for the boat to go 692 mi. 56.81$\frac{9}{11}$ rd.?

65. What part of a tract of land containing 160.125 A. was sold, if the remainder was 17 A. 120 sq. rd. 9 sq. yd.?

66. Change 3.25 qt. wine measure to the decimal of a quart dry measure.

67. Change 11.015 oz. Troy to the decimal of a pound Avoirdupois.

68. A meter is 39.3709 inches in length; how many meters in a mile?

69. A kilometer is equal to one thousand meters; what decimal of a mile is 3.5 kilometers?

70. A square meter is equal to 1550 sq. in.; how many square meters in 2.471 acres?

QUESTIONS ON ARITHMETIC.

PART I.

What is arithmetic? Define unit; number; integer. What is an abstract number? A concrete number? A simple number? A compound number? Define fraction; problem; rule; sign. What is notation? What is numeration? Name the letters that are used in Roman notation. How many figures are used to express numbers? Which figures are called significant, and why?

Define addition; subtraction; multiplication; division.

What is United States money? What other name is given to it? Of what metals are the United States coins made? Name the gold coins; the silver coins. How are dollars distinguished from cents when written in figures?

What is the meaning of reduction? How are fractions named? Define numerator; denominator; proper fraction. What is a mixed number? An improper fraction? What form of fraction is sometimes called complex? When is a fraction said to be in its lowest terms? When is one number said to measure another? What is necessary before adding or subtracting fractions?

What is cancellation? What is a factor of a number? Define prime number; prime factors of a number. Define common divisor of two or more numbers. Define greatest common divisor of two or more numbers. How is the greatest common divisor used? Define multiple; common multiple; least common multiple. How is the least common multiple used?

What is a bill? What is an account? What is the meaning of creditor? What is the meaning of debtor? When a debtor makes a payment, under what heading is the item placed? When a debtor receives value, under what heading is the item placed?

What is a denominate number? Name and define the two kinds. Name the different measures and weights, and give their uses.

Define decimal fraction, and show how it is written. Define mixed decimal; complex decimal. How many decimal places in any product? How many decimal places in any quotient? What is a denominate fraction? Give an example.

RULES AND TABLES.

PART I.

SIMPLE NUMBERS.

NOTATION.

BEGIN at the left hand, and write the figures belonging to the highest period.

Write the hundreds, tens, and units of each period in their order, putting a cipher in the place of any order that is omitted.

NUMERATION.

Point off the number into periods of three figures each, beginning at the right hand.

Beginning at the left hand, read each period separately, giving the name to each period except the last.

ADDITION.

Write the numbers to be added so that all figures of the same order shall stand in the same column.

Add all the figures in each column separately, beginning at the right, and place the right-hand figure of each sum under the column added, carrying the remaining figure or figures, if any, to the next column.

SUBTRACTION.

Write the less number under the greater so that figures of the same order shall stand in the same column.

Begin at the right, and subtract each figure of the subtrahend from the figure above it, and write the difference beneath.

If any figure of the subtrahend is greater than the figure above it, increase the upper figure by 10 before subtracting, and then add 1 to the next figure of the subtrahend and proceed as before.

MULTIPLICATION.

Write the multiplier under the multiplicand so that units of the same order shall stand in the same column.

Begin at the right, and multiply each figure of the multiplicand by the unit figure of the multiplier, placing the right-hand figure of each product under the figure multiplied, and adding the left-hand figure or figures, if any, to the next product.

If the multiplier consists of more than one figure, proceed with each figure in the same manner as with the first, placing the right-hand figure of the first product under that figure of the multiplier which is used to produce it; the sum of the partial products is the required product.

DIVISION.

Write the divisor at the left of the dividend, with a line between them.

Find how many times the divisor is contained in the least number of figures at the left hand of the dividend that will contain it, and write the result for the first figure of the quotient.

Multiply the divisor by this quotient figure, and subtract the product from those figures of the dividend in which it was contained. Annex to the remainder the next figure of the dividend for a new dividend, and divide as before.

Proceed in the same manner till all the figures of the dividend have been used.

If any new dividend does not contain the divisor, write a cipher in the quotient and annex the next figure of the dividend.

UNITED STATES MONEY.

REDUCTION.

CASE I.

To change dollars to cents, multiply by 100. To change cents to mills, multiply by 10.

To change dollars and cents to cents, or dollars, cents, and mills to mills, remove the decimal point and the sign for dollars. To change dollars and cents, or cents, to mills, remove the decimal point and the sign as before, and annex a cipher.

CASE II.

To change cents to dollars, divide by 100. To change mills to dollars, divide by 1000.

ADDITION.

Add as in simple numbers, placing dollars under dollars, cents under cents, and mills under mills. Write the decimal point in the amount between the dollars and cents.

SUBTRACTION.

Subtract as in simple numbers, placing denominations of the same kind under each other. Write the decimal point in the remainder between the dollars and cents.

MULTIPLICATION.

Multiply as in simple numbers, and place the decimal point in the product between the dollars and cents.

DIVISION.

Divide as in simple numbers, and place the decimal point in the quotient between the dollars and cents. When there are dollars and cents in both dividend and divisor, change both to the same denomination before performing the division.

COMMON FRACTIONS.

REDUCTION.

CASE I.

DIVIDE both numerator and denominator by any number that will measure them, until they are prime to each other.

CASE II.

Divide the required denominator by the given denominator, and multiply the terms of the given fraction by the quotient.

CASE III.

Multiply the whole number by the denominator, and if there is a numerator add it to the product, and place the denominator under the result.

CASE IV.

Divide the numerator by the denominator.

CASE V.

Multiply both terms of each fraction by the denominators of all the other fractions.

ADDITION.

When fractions have the same denominator, add the numerators and place the common denominator under the sum. When they have different denominators, change them to a common denominator, and add as before.

SUBTRACTION.

When the fractions have the same denominator, find the difference of the numerators and place it over the common denominator. When they have different denominators, change the fractions to a common denominator before subtracting the numerators.

CANCELLATION.

Cancel all the factors common to both dividend and divisor, and divide the product of the remaining factors of the dividend by the product of the remaining factors of the divisor.

MULTIPLICATION.

Change whole or mixed numbers to improper fractions, and cancel all factors common to the numerators and denominators. Multiply all the remaining numerators for a new numerator, and all the remaining denominators for a new denominator.

DIVISION.

Change whole or mixed numbers to improper fractions. Invert the divisor, and proceed as in multiplication.

GREATEST COMMON DIVISOR.

Divide the greater number by the less, and the divisor by the remainder, and so continue till there is no remainder. The last divisor will be the greatest common divisor.

LEAST COMMON MULTIPLE.

Divide by any prime number that will exactly measure two or more of the given numbers, placing the quotients and undivided numbers in a new line. Proceed in the same manner till no two of the numbers can be further divided. The product of all the divisors and the remaining numbers will be the least common multiple required.

LEAST COMMON DENOMINATOR OF FRACTIONS.

Find the least common multiple of the denominators of the fractions for the least common denominator.

Divide the common denominator by each denominator, and multiply the terms of each fraction by the quotient obtained by using its denominator for a divisor.

DENOMINATE NUMBERS.

REDUCTION DESCENDING.

MULTIPLY the number of the highest denomination given by the number required of the next lower denomination to make 1 of the denomination multiplied, and to this product add any units of the lower denomination that may be in the multiplicand. Proceed in this manner until the reduction is completed.

REDUCTION ASCENDING.

Divide the given denomination by the number required to make 1 of the next higher denomination, and write the remainder, if any, as part of the answer. Divide the quotient thus obtained in the same manner, and so proceed until the reduction is completed. The last quotient, with any remainders that there may be, will be the answer.

COMPOUND ADDITION.

Write the numbers so that units of the same denomination shall stand in the same column. Add first the column of the lowest denomination; divide the sum by the number of that denomination required to make a unit of the next higher; write the remainder, if any, under the column added, and carry the quotient to the next column. Proceed with the remaining columns in the same manner.

COMPOUND SUBTRACTION.

Write the subtrahend under the minuend so that units of the same denomination shall stand in the same column. Begin with the lowest denomination to subtract, and place the difference beneath. If any denomination of the subtrahend is greater than the corresponding denomination of the minuend, add to the latter as many units as make one of the next higher denomination, subtract as before, and carry one to the next higher denomination of the subtrahend, as in simple subtraction.

COMPOUND MULTIPLICATION.

Write the multiplier under the lowest denomination of the multiplicand. Multiply each denomination separately, beginning at the lowest, and reduce the product as in compound addition, writing the remainder, if any, under the denomination multiplied, and carrying the quotient, if any, to the next product.

COMPOUND DIVISION.

Commence by dividing the highest denomination. Write the quotient under that denomination; reduce the remainder, if any, to the next lower denomination, adding to this result the given number of that denomination in the dividend, and divide as before.

To divide a compound number by a compound number, reduce them both to the lowest denomination mentioned in either, and divide as in simple numbers.

LONGITUDE AND TIME.

CASE I.

Divide the difference in longitude by 15, and the degrees, minutes, and seconds of the quotient will be the difference in time in hours, minutes, and seconds, respectively.

CASE II.

Multiply the hours, minutes, and seconds of time by 15, and the product will be the difference in longitude in degrees, minutes, and seconds, respectively.

DECIMAL FRACTIONS.

NOTATION.

WRITE the numerator in figures, prefixing the decimal point and as many ciphers as may be needed to give each figure its proper value.

NUMERATION.

Read the decimal as a whole number, giving it the name of the last or right-hand order.

ADDITION.

Write the numbers so that figures of the same order shall stand in the same column; add as in whole numbers, and place the decimal point in the sum directly under the column of decimal points.

SUBTRACTION.

Write the subtrahend under the minuend so that figures of the same order shall stand in the same column; subtract as in whole numbers, and place the decimal point as in addition.

MULTIPLICATION.

Multiply as in whole numbers, and point off as many decimal places in the product as there are in both multiplicand and multiplier.

DIVISION.

Divide as in whole numbers, and point off as many decimal places in the quotient as the number of decimal places in the dividend exceeds the number in the divisor, but if there are not as many, supply the deficiency by prefixing ciphers.

REDUCTION.

CASE I.

Omit the decimal point, write the proper denominator under the numerator, and reduce to lowest terms.

CASE II.

Annex ciphers as decimal places to the numerator, and divide by the denominator, pointing off in the quotient as in division of decimals.

DENOMINATE FRACTIONS.

CASE I.

MULTIPLY the given fraction, as in reduction of denominate numbers, by the numbers required to reduce it to the proper denomination.

CASE II.

Divide the given fraction, as in reduction of denominate numbers, by the numbers required to reduce it to the proper denomination.

CASE III.

Multiply the given fraction by the number required to reduce it to the next lower denomination. When the product is greater than a unit, change to a whole or mixed number, multiply the fractional part, if any, by the number required to reduce it to the next lower denomination, and proceed as before until the reduction is completed.

CASE IV.

Reduce the given numbers to the lowest denomination mentioned in either. Write the number which is to become the fractional part, for the numerator of the required fraction, and the remaining number for the denominator, and change the fraction to its lowest terms, or to a decimal if necessary.

TABLES

OF

WEIGHTS AND MEASURES.

United States Money.

10 mills . . . . . = 1 cent.
10 cents . . . . . = 1 dime.
10 dimes . . . . . = 1 dollar.
10 dollars . . . . . = 1 eagle.

English Money.

4 farthings . . . = 1 penny.
12 pence . . . . = 1 shilling.
20 shillings . . . = 1 pound *or* sovereign.
21 shillings . . . = 1 guinea.

Avoirdupois Weight.

16 ounces . . . = 1 pound.
100 pounds . . = 1 hundredw't.
20 hundredw't, *or* 2000 lbs. = 1 *short* ton.
28 pounds . . . = 1 quarter.
4 quarters, *or* 112 lbs. = 1 hundredw't.
20 hundredw't, *or* 2240 lbs. = 1 *long* ton.

NOTE.—The *long* or *gross* ton is principally used in estimating the weight of goods at custom-houses, and in weighing coal and iron.

Troy Weight.

24 grains . . . = 1 pennyweight.
20 pennyweights = 1 ounce.
12 ounces . . . = 1 pound.

Dry Measure.

2 pints . . . . . = 1 quart.
8 quarts . . . . . = 1 peck.
4 pecks . . . . . = 1 bushel.
2150.42 cu. inches . . = 1 bushel.

Liquid Measure.

4 gills . . . . . = 1 pint.
2 pints . . . . . = 1 quart.
4 quarts . . . . = 1 gallon.
31½ gallons . . . = 1 barrel.
2 barrels, *or* 63 gallons . = 1 hogshead
231 cu. in. = 1 standard liquid gal

Long Measure.

12 inches . . . . . = 1 foot.
3 feet . . . . . = 1 yard.
5½ yards . . . . . = 1 rod.
320 rods . . . . . = 1 mile.
4 inches . . . . . = 1 hand.

Square Measure.

144 square inches = 1 square foot.
9 square feet . = 1 square yard.
30¼ square yards = 1 square rod.
160 square rods = 1 acre.
640 acres . . . = 1 square mile *or* 1 section of government land.
36 square miles . = 1 township.

Apothecaries' Weight.

20 grains . . . = 1 scruple (℈).
3 scruples . . = 1 drachm (ʒ).
8 drachms . . = 1 ounce (℥).
12 ounces . . . = 1 pound (℔).

Apothecaries' Liquid Measure.

60 minims *or* drops = 1 fluid drachm.
8 fluid drachms . = 1 fluid ounce.
16 fluid ounces . = 1 pint.
8 pints . . . . = 1 gallon.

Cubic Measure.

1728 cubic inches = 1 cubic foot.
27 cubic feet . . = 1 cubic yard.
40 feet of round *or* 50 feet of hewn timber = 1 ton.
16 cubic feet . . = 1 cord foot.
8 cord feet, *or* 128 cubic feet = 1 cord of wood.
24¾ cubic feet . = 1 perch of stone.

Measure of Time.

60 seconds . . . . = 1 minute.
60 minutes . . . . = 1 hour.
24 hours . . . . = 1 day.
7 days . . . . . = 1 week.
12 calendar months, *or* 365 days = 1 year.
366 days . . . . = 1 leap year.
100 years . . . . = 1 century.

Mariners' Measure.

6 feet . . . . = 1 fathom.
1.16 miles (nearly) = 1 geog. mile *or* knot.
3 geographic *or* nautical miles = 1 league.
60 geographic, *or* 69⅛ statute miles = 1 degree.
360 degrees = 1 circumference of the earth.

Surveyors' Linear Measure.

7.92 inches . . . . = 1 link.
25 links . . . . . = 1 rod.
4 rods, *or* 66 feet . . . = 1 chain.
80 chains . . . . . = 1 mile.

Surveyors' Square Measure.

625 square links = 1 pole.
16 poles . . . = 1 square chain.
10 square chains = 1 acre.

Board Measure.

12 thirds (‴) = 1 second (1″).
12 seconds = 1 inch *or* prime (1′).
12 inches *or* primes = 1 foot (1 ft.)

Circular Measure.

60 seconds . . . = 1 minute.
60 minutes . . . = 1 degree.
30 degrees . . . = 1 sign.
12 signs, *or* 360 degrees = 1 circumference.
90 degrees . . . = 1 quadrant.
60 degrees . . . = 1 sextant.

Longitude and Time.

15° of longitude = a difference of 1 hour in time.
15′ of longitude = a difference of 1 minute in time.
15″ of longitude = a difference of 1 second in time.

Miscellaneous Table.

12 units . . . . . = 1 dozen.
12 dozen . . . . . = 1 gross.
20 units . . . . . = 1 score.
24 sheets . . . . . = 1 quire.
20 quires . . . . . = 1 ream.
2 reams . . . . . = 1 bundle.
5 bundles . . . . . = 1 bale.

1 pound, Troy *or* Apothecaries' weight = 5760 grains.
1 pound, Avoirdupois weight = 7000 grains.
196 pounds . . . = 1 barrel flour
200 pounds . . . = 1 barrel fish.
200 pounds beef *or* pork = 1 barrel.
100 pounds grain *or* flour = 1 cental.
100 pounds dried fish = 1 quintal.

ANSWERS TO GRADED PROBLEMS.

(EXCEPTING NOTATION AND NUMERATION.)

PART I.

Page 6.

20. 8402863.
21. 23572222.
22. 2089922.
23. 12630635.
24. 6927507.
25. 8945235.
26. 14701084.
27. 10977954.
28. 81963.
29. 109842.
30. 155646.
31. 118962.
32. 96349.
33. 91246.
34. 85149.
35. 74863.
36. 149473.
37. 90987.
38. 533460.
39. 102248.
40. 2554531.

Page 7.

41. 1123209.
42. 12565.
43. 27637.
44. 37118.
45. 28681.
46. 21334.
47. 451 marbles.
48. 434 chestnuts.
49. 82 cents.
50. 75 plums.
51. 810 cows.
52. 154 miles.
53. 169 marbles.
54. 256 birds.

Page 8.

55. 4911945.
56. 1998999992.
57. 60004.
58. 18997938.
59. 2718360.
60. 857719.
61. 36099982.
62. 88081.
63. 3426112.
64. 21032589.
65. 7688908.
66. 6688971.
67. 13789423.
68. 22718166432.
69. 10509046.
70. 675713.
71. 9449596.
72. 34511103.
73. 4792256.
74. 11072264.
75. 10858844.
76. 9985146.
77. 103522.
78. 1189.
79. 10235.
80. 8141342.

Page 9.

81. 7209659.
82. 27067.
83. 610482.
84. 9399261.
85. 4533922.
86. 49020.
87. 6470342.
88. 100187.
89. 196 birds.
90. 47 marbles.
91. 592.
92. 104 sheep.
93. 206 cows.
94. 2988 men.
95. 281 bales.
96. 68639.
97. 3609437.
98. 8998601.
99. 593359.
100. 84880.
101. 8119.

Page 10.

102. 95566; 64[illegible]; 7403.
103. 50813294; 566205276; 4660304964.
104. 5888943; 34679331; 83099529.
105. 10965170; 53729333; 664489302.
106. 5794452; 36698196; 576547974.
107. 3825155; 20655837; 720659202.
108. 1468922; 10177531; 75124868.
109. 25676672; 123568984; 1489246976.

110. 13332347; 36187799; 1864623959.
111. 1285268; 1890100; 52695988.
112. 1051872; 2498196; 31293192.
113. 2345892; 37534272; 556758368.
114. 1295306; 1772524; 61697470.
115. 12250710; 51452982; 530047386.
116. 1361360; 4084080; 100121840.
117. 6860424114; 972552.
118. 37517876; 612360.
119. 43558944; 10815.
120. 439316190; 14040.
121. 47537490; 522693.
122. 2999115; 1177225.
123. 537116673; 625636.
124. 5689309080; 49020000.
125. 1730944861; 3607435.
126. 6618067083; 9051264.
127. 4829519000.
128. 30372866776.
129. 2450844748.
130. 34204509171.

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131. 70273359200.
132. 165797336.
133. 76670352.
134. 41457897945.
135. 52658892.
136. 156514305.
137. 2333317233.
138. 1131400836.
139. 984732584.
140. 8, 7, 12, 9, 6, 1, 5, 11, 3, 10, 4, 2.
141. 2478388 dollars.
142. 14280 dollars.
143. 998001.
144. 31536000 sec.
145. 28416000 ounces.
146. 784080000 square inches.
147. 46656 cu. inches.
148. 283392 letters.

Page 12.

149. 75438; 9174 and 66 rem.; 1059 and 123 rem.
150. 162103; 15197 and 10 rem.; 2593 and 243 rem.
151. 1589; 227; 42.
152. 40; 17; 85.
153. 19295; 1135; 17.
154. 2832; 236; 48.
155. 12036; 1003; 48.
156. 32701; 617; 106.
157. 11106; 2468; 48.
158. 176181 and 1 rem.; 3388 and 16 rem.; 159 and 28 rem.
159. 66480; 3324; 120.
160. 69918; 3252; 344.
161. 726846; 57937; 5267.
162. 7119; 791; 45.
163. 847975; 8025; 4755.
164. 64; 408.
165. 1003; 235.
166. 6018; 3207.
167. 2675; 656.
168. 28; 31416.
169. 18; 2478, 200 rem.
170. 19; 56.
171. 74209; 987.
172. 3248; 8.
173. 263088.
174. 6955658 and 30 rem.
175. 882161280.
176. 518918400.
177. 896313600.

Page 13.

178. 677147654
179. $65 loss.
180. 1253.
181. $73.
182. 5926912.
183. $7884.
184. 7485693.
185. 252584.
186. 207515.
187. 88189.
188. 165920.
189. 8 barrels.
190. 17 dollars.
191. 490 chestnuts.
192. $180 gain.

Page 14.

193. 50 dollars.
194. 4615 and 360 rem.
195. 12784 and 36 rem.
196. 200 tons.
197. 8 pounds.
198. 475.
199. 90.
200. 223211.
201. 6181 and 873 rem.
202. 10 cows.
203. 12 barrels.
204. 320 rods.
205. 34 miles.
206. $79.20.
207. 64294864.

Page 15.

208. 2284560.
209. 704 marbles.
210. 8208.
211. 12966.
212. 134790.
213. 34.

214. 20 pigs.
215. 321832 pounds.
216. $154 gain.
217. 7179 bales.
218. 2838 bu., 19 cents rem.
219. 1 dollar per day.
220. 4090000.
221. 1223790.
222. $228.16.

Page 16.

223. 94 pair.
224. 38868.
225. 62800.
226. 1246571.
227. $8 per barrel.
228. $5984.
229. 308 hours.
230. 484 sec., 136 rem.
231. $311220.
232. 2604, 66 rem.
233. 152; 209.
234. $319; $379.
235. James 39 cents; John 57 cents.
236. 9828.
237. 26570.
238. 227686.
239. $7.59.
240. $2223.

Page 17.

241. 915.
242. $49.91 gain.
243. 19 tons.
244. 83432, 1772 rem.
245. 6596380.
246. 894827.
247. 45 cents.
248. 19 hours.
249. 120 miles.
250. 6289164.
251. 2267125011.
252. 216.
253. 117157.
254. 23 sheep.
255. 51 cents per gal.
256. B, 17 mi. ahead.

Page 18.

257. 88 horses.
258. 20080.
259. 3004.
260. 2020.
261. 11978.
262. 9000000.
263. 1 day.
264. 51 barrels.
265. 483 and 414 acres.
266. $1386 gain.
267. 7 weeks.
268. 40 dollars.
269. 14.
270. 4368100.

Page 19.

271. 76 Senators.
272. 25.
273. 75.
274. 301 times.
275. 22 dollars.
276. 516405.
277. 16 days.
278. 150 acres at $100 each.
279. $360 gain.
280. 29254.
281. $5.65 gain.
282. $25974000.
283. 100.
284. 2985984.

Page 21.

29. 19270 dimes; 192700 cents.
30. $271910; 271910000 mills.
31. 99900 cents; 999000 mills.
32. 13579000 dimes.
33. 8764100 dimes; 87641000 cents.
34. $1513440.
35. 33333000 cents; 333330000 mills.
36. 16400 cents; 164000 mills.
37. $900; 900000 mills.
38. 2000 dimes.
39. 100 dimes.
40. 14600 mills.
41. 23000 cents.
42. 140000 mills.
43. 14280 dollars.
44. 2640 dollars.
45. 1642000 mills.
46. 37500 cents.
47. 16540 dimes.
48. 2560 cents.
49. 3400 mills.
50. 2520000 mills.
51. 1296000 cents.
52. 1370 mills.
53. 1110 dimes.
54. 64000 mills.
55. 24000 cents.
56. 960000 mills.
57. 6500 cents.
58. 74200 mills.
59. 500000 mills.
60. 2009000 mills.
61. 600000 cents.
62. 790 dimes.

Page 22.

63. 320000 mills.
64. 90000 dimes.
65. 97000000 mills.
66. 4017000 cents.
67. 7560 dollars.
68. 61700 mills.
69. 740 cents.
70. 650 dimes.
71. 5604800 dimes.
72. 6409 cents; 125000 mills.
73. 78309 mills; 18915 cents.
74. 70090 cents; 799920 mills.
75. 606040 mills; 10001 cents.
76. 8709 cents; 906170 mills.
77. 1060 mills; 25000 dimes.
78. 71400 cents; 15800000 mills.
79. 64090 mills; 75619 cents.

80. 8208 cents; 199000 mills.
81. 60 mills; 3680000 mills.
82. 1060 cents; 1890.5 dimes.
83. 16050 mills; 4440 dimes.
84. 90006 cents; 879250 mills.
85. 18700 mills; 750000 cents.
86. 614670 mills; 356 dimes.
87. 7140 cents; 184900 cents.
88. 1706 mills; 27270 mills.
89. 506 cents; 250 mills.
90. 1650 mills; 101 dimes.
91. 1606 cents; 98000 cents.
92. 21406 cents.
93. 60410 mills.
94. 5508 mills.
95. 47 cents.
96. 1617670 mills.
97. 16016 cents.

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98. $998.75.
99. 889 dimes 87 mills
100. 40 double eagles.
101. 400 eagles 4 dimes
102. 53064 ct. 5 m.
103. $7987.64.
104. $125.
105. 305 dimes.
106. $42.584.
107. $196.
108. $171.20.
109. $784.
110. $1784.
111. 72 eagles.
112. 163 eagles.
113. 311 eagles.
114. 3423 double eagles.
115. 17 dimes.
116. 164 dimes.
117. 11 eagles.
118. 3070 double eagles.
119. 700 cents.
120. $66.
121. 12 eagles.
122. $76.
123. 60 dimes.
124. 600 dimes.
125. 8 dollars.
126. 16 dollars.
127. 408 double eagles.
128. 211 eagles.
129. 6006 dollars.
130. 210 dimes.

Page 24.

131. $31.
132. 101 cents.
133. $178.50.
134. 1600 eagles.
135. $1640.
136. $728.
137. $12.
138. 5940 less.
139. 61 eagles.
140. 1656 more.
141. 6 eagles.
142. 54725.
143. 23030 eagles.
144. 13700 dimes.
145. 1200 eagles.
146. 4002 double eagles.
147. $750.10.
148. 7.
149. $935.50.

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150. $10567.543.
151. $4063.30.
152. $3003.424.
153. $9835.348.
154. $6448.30.
155. $2541.141.
156. $11207.098.
157. $2580.712.
158. $2718.022.
159. $9049.971.
160. $6875.531.
161. $9955.764.
162. $10316.871.
163. $7149.134.
164. $2618.376.
165. $3617.569.
166. $3176.515.
167. $2571.441.
168. $9194.11.
169. $8649.835.
170. $22543.62.
171. $44730.
172. $20205.965.

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173. $2240.045.
174. $15.30.
175. $2303.70.
176. $5573.523.
177. $177.65.
178. $20.26.
179. $238.92.
180. $688.90.
181. $9800.
182. $1729.50.
183. $7558.
184. $9.77.

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185. $6517.36.
186. $179164.89.
187. $842.74.
188. $8506.62.
189. $8054.28.
190. $8779.05.
191. $12.47.
192. $996.38.
193. $3070.53.
194. $15.40.
195. $990.39.
196. $181.25.
197. $257.50.
198. $262.29.
199. $17787.34.
200. $24250.85.
201. $819.85.
202. $1635.60.
203. $1071.18.
204. $24000.02.
205. $89236.20.
206. $550.25.

207. $24358.09.
208. $82163.
209. $583.
210. $10570.
211. $1672 gain.

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212. $12768; $25380.60.
213. $10723.65; $21327.25.
214. $98465.85; $132030.
215. $27651.68; $44611.05.
216. $67502.16; $88192.
217. $448366.657; $63565.50.
218. $1714128; $27412.682.
219. $16792.60; $88641.575.
220. $73548; $8649190.
221. $4125752; $985320.525.
222. $11059.94; $152072.36.
223. $97072.48; $18315.165.
224. $157576.16; $191280.375.
225. $69433; $8557.50.
226. $70020.70; $1095.75.
227. $88216.65; $917.50.
228. $48416022; $50.
229. $1272.32; $7871.85.
230. $105896; $1901.90.
231. $149665.50; $807.10.
232. $786270.48; $133.375.
233. $11525557.00; $.909.
234. $175481.25; $331.50.
235. $283315.09; $460.60.
236. $740623.50; $29.25.
237. $3306.90.
238. $59.52.
239. $1130.88.
240. $3962.42.
241. $52.75.

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242. $69.784; $57.784.
243. $67.845+; $7.385.
244. $49.14; $60.83.
245. $2.10; $40.15.
246. $39.98; $160.01.
247. $99; $673.
248. $85.40; $756.04.
249. $113.07+; $657.42.
250. $10.64: $657.42.
251. $13.60; $1049.23.
252. $1.36; $6543.27+
253. $19.01; $96.
254. $9; $756.04.
255. $19,95; $.80.
256. $16.50; $9.87.
257. $25080; $7.86.
258. $21; $9.37.
259. $15; $.537.
260. $2.31; $6.30.
261. $21.01; $3.47.
262. $2.10; $6.70.
263. 149 cows.
264. 530 lb.
265. $37.50 loss.
266. $15.75.
267. $525.25.

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268. $.32.
269. 125 bar., $7 rem.
270. 81 boxes.
271. 126 gallons.
272. 197 cows, $20 rem.
273. 40 barrels.
274. 40 quarts.
275. 6 horses.
276. 9 houses.
277. 705 tons.
278. 4 dollars.
279. 16 grammars.
280. 27 dozen.
281. 5 hundred.
282. 763 acres, $6.00 rem.
283. 1158 barrels.
284. $.226.

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285. $2520.21.
286. $2435.42.
287. $4136.11.
288. $2924.75.
289. $33.02.
290. $205.
291. $19560.08.
292. 39360.
293. 2550.
294. 501, $2.01 rem.
295. $151.20.
296. $1941.50.
297. $817566.56.
298. $16657.64.
299. $9075.22.
300. $94325.
301. $386829.75.
302. $39614.50.
303. $8838.
304. $320.45.

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305. $41.50.
306. No difference.
307. 180 eagles.
308. $12829.05.
309. 2400 horses.
310. $780.31.
311. $9 apiece.
312. 130 half eagles.
313. $46.44.
314. $1285.
315. 19 houses, $900 rem.
316. 124.
317. $704.75.
318. $51.
319. $580.25.
320. $2.70.

321. $5967.
322. 56 yards.

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323. 19 bushels.
324. $9.
325. $587.50.
326. $1292.
327. $1242.59.
328. $73154.
329. 90 cents; 16 days.
330. $400 gain.
331. 20 tons.
332. $22.40 gain.
333. 619020 mills.
334. 246000 cents.
335. 19 skins; $1.17.
336. 499 pounds.
337. 56 lb. of coffee; 20 lb. of tea.

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338. 32 yards.
339. $6.55 per barrel.
340. 19 days.
341. $2100.
342. 7 hours.
343. $25.20.
344. $540.
345. $1.44 gain.
346. 38 pounds.
347. $226.80.
348. $176.
349. $147986.
350. $11989.
351. 105 pounds.
352. 20 cows.

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28. $\frac{18}{25}$.
29. $\frac{9}{16}$.
30. $\frac{67}{250}$.
31. $\frac{1}{3}$.
32. $\frac{1}{40}$.
33. $\frac{40}{9}$.
34. $\frac{1}{2}$.
35. $\frac{1}{100}$.
36. $\frac{3}{2}$.
37. $\frac{7}{20}$.
38. $\frac{5}{2}$.
39. $\frac{1}{5}$.
40. $\frac{5}{1}$.
41. $\frac{3}{4}$.
42. $\frac{21}{77}$; $\frac{16}{48}$.
43. $\frac{4}{8}$; $\frac{15}{27}$.
44. $\frac{8}{24}$; $\frac{24}{36}$.
45. $\frac{9}{21}$; $\frac{64}{80}$.
46. $\frac{66}{72}$; $\frac{54}{66}$.
47. $\frac{50}{100}$; $\frac{22}{52}$.
48. $\frac{15}{45}$; $\frac{72}{96}$.
49. $\frac{32}{60}$; $\frac{40}{75}$.
50. $\frac{57}{81}$; $\frac{45}{60}$.
51. $\frac{847}{2835}$; $\frac{888}{1600}$.
52. $\frac{36}{42}$; $\frac{270}{360}$.
53. $\frac{22}{121}$; $\frac{98}{133}$.
54. $\frac{126}{144}$; $\frac{66}{88}$.
55. $\frac{55}{85}$; $\frac{95}{120}$.
56. $\frac{30}{78}$; $\frac{155}{305}$.
57. $\frac{16}{200}$; $\frac{145}{155}$.
58. $\frac{620}{900}$; $\frac{805}{1610}$.

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59. $\frac{6}{3}$; $\frac{9}{3}$; $\frac{12}{3}$.
60. $\frac{144}{9}$; $\frac{180}{9}$; $\frac{270}{9}$.
61. $\frac{143}{11}$; $\frac{165}{11}$; $\frac{231}{11}$.
62. $\frac{126}{7}$; $\frac{175}{7}$; $\frac{259}{7}$.
63. $\frac{15}{2}$; $\frac{19}{2}$.
64. $\frac{25}{3}$; $\frac{37}{3}$; $\frac{65}{3}$.
65. $\frac{81}{11}$; $\frac{172}{11}$; $\frac{333}{11}$.
66. $\frac{79}{9}$; $\frac{107}{9}$; $\frac{476}{9}$.
67. $\frac{101}{15}$; $\frac{144}{15}$; $\frac{464}{15}$.
68. $\frac{252}{33}$; $\frac{591}{33}$; $\frac{652}{33}$.
69. $\frac{232}{27}$; $\frac{639}{7}$.
70. $\frac{896}{17}$; $\frac{79}{8}$.
71. $\frac{50}{3}$; $\frac{58}{3}$.
72. $\frac{170}{14}$; $\frac{501}{14}$.
73. $\frac{12858}{91}$; $\frac{18290}{91}$.
74. $\frac{1250}{75}$; $\frac{5697}{75}$.
75. 9.
76. 15.
77. 8.
78. $11\frac{1}{16}$.
79. $11\frac{1}{4}$.
80. $12\frac{10}{17}$.
81. $12\frac{8}{9}$.
82. $11\frac{9}{31}$.
83. $30\frac{3}{4}$.
84. $308\frac{23}{37}$.
85. $35\frac{1}{2}$.
86. 21 gal.
87. 7 bu.
88. 7 qt.
89. 18 yd.
90. $6\frac{3}{4}$ in.

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91. $\frac{72}{84}$; $\frac{44}{84}$; $\frac{50}{84}$; $\frac{168}{84}$.
92. $\frac{490}{210}$; $\frac{90}{210}$; $\frac{120}{210}$; $\frac{208}{210}$.
93. $\frac{429}{286}$; $\frac{242}{286}$; $\frac{858}{286}$; $\frac{221}{286}$.
94. $\frac{253}{230}$; $\frac{190}{230}$; $\frac{184}{230}$; $\frac{64}{230}$.
95. 252.
96. 1950.
97. 5814.
98. 1188.
99. $\frac{108}{756}$; $\frac{252}{756}$; $\frac{315}{756}$.
100. $\frac{189}{693}$; $\frac{132}{693}$; $\frac{231}{693}$.
101. $\frac{425}{475}$; $\frac{437}{475}$.
102. $\frac{420}{570}$; $\frac{304}{570}$.
103. $\frac{50}{85}$; $\frac{68}{85}$.
104. $\frac{693}{756}$; $\frac{108}{756}$; $\frac{336}{756}$.
105. 108.
106. 385.
107. 4074.
108. 10885.
109. 3255.
110. 3895.
111. $\frac{18}{27}$; $\frac{15}{27}$; $\frac{9}{27}$.
112. $\frac{18}{36}$; $\frac{27}{36}$; $\frac{28}{36}$.
113. $\frac{60}{105}$; $\frac{69}{105}$; $\frac{84}{105}$.
114. $\frac{27}{144}$; $\frac{76}{144}$; $\frac{90}{144}$; $\frac{68}{144}$.

115. $\frac{1740}{2465}$; $\frac{1955}{2465}$; $\frac{1972}{2465}$.

116. $\frac{91}{117}$; $\frac{78}{117}$; $\frac{63}{117}$.

117. $\frac{152}{297}$; $\frac{108}{297}$; $\frac{165}{297}$.

118. $\frac{945}{1008}$; $\frac{720}{1008}$; $\frac{616}{1008}$; $\frac{476}{1008}$.

119. $\frac{28}{77}$; $\frac{66}{77}$.

120. $\frac{56}{84}$; $\frac{42}{84}$; $\frac{12}{84}$.

121. $\frac{1584}{1728}$; $\frac{1412}{1728}$; $\frac{5820}{1728}$.

122. $\frac{210}{756}$; $\frac{252}{756}$; $\frac{324}{756}$.

123. $\frac{656610}{1348865}$; $\frac{269973}{1348865}$; $\frac{449055}{1348865}$.

124. $\frac{2191888}{4385976}$; $\frac{2192488}{4385976}$; $\frac{2194888}{4385976}$.

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125. $4\frac{756}{11385}$; $7\frac{884}{1024}$.

126. $3\frac{1236819}{3462201}$; $3\frac{1995}{3250}$.

127. $7\frac{866}{2652}$; $2\frac{7700}{966800}$.

128. $8\frac{370}{1800}$; $19\frac{128}{144}$.

129. $3\frac{3780}{34888}$; $5\frac{1184}{16840}$.

130. $11\frac{252}{288}$; $4\frac{76332}{172880}$.

131. $11\frac{8}{192}$; $34\frac{858}{1260}$.

132. $36\frac{200}{693}$.

133. $25\frac{12}{112}$.

134. $5\frac{359}{1463}$.

135. $4\frac{852}{946}$.

136. $6\frac{17}{420}$.

137. $1\frac{1803}{4024}$.

138. $7\frac{785}{84}$.

139. $48\frac{111}{315}$ yards.

140. $54\frac{98}{72}$ gallons.

141. $67\frac{68}{240}$ yards.

142. $45\frac{86}{120}$.

143. $134\frac{1}{70}$ gallons.

144. $24\frac{24}{84}$.

145. $232\frac{24}{84}$ pounds.

146. $458\frac{39}{140}$ acres.

147. $497\frac{216}{320}$.

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148. $\frac{10}{24}$; $2\frac{17}{24}$.

149. $11\frac{802}{995}$.

150. $4\frac{3}{55}$; $82\frac{5}{88}$.

151. $11\frac{41}{70}$; $1\frac{45}{84}$.

152. $24\frac{1}{30}$; $8\frac{6}{8}$.

153. $13\frac{17}{35}$; $1\frac{11}{12}$.

154. $5\frac{17}{21}$; $11\frac{14}{18}$.

155. $\frac{1}{12}$; $12\frac{4}{5}$.

156. $10\frac{232}{255}$; $32\frac{18}{15}$.

157. $24\frac{18}{20}$; $60\frac{18}{40}$.

158. $24\frac{37}{4}$; $11\frac{36}{64}$.

159. $8\frac{9}{48}$; $5\frac{11}{12}$.

160. $101\frac{18}{40}$; $14\frac{831}{864}$.

161. $8\frac{2}{5}$; $3\frac{663}{1064}$.

162. $18\frac{8}{11}$; $114\frac{1}{126}$.

163. $43\frac{46}{48}$; $10\frac{21}{180}$.

164. $\$25\frac{88}{40}$.

165. $49\frac{23}{28}$ gallons.

166. $31\frac{37}{70}$ yards.

167. 128.

168. 2, 3; 2, 2, 2; 2, 7; 2, 2, 2, 2, 2, 2, 5; 2, 2, 3, 3; 2, 3, 7.

169. 2, 2, 2, 2; 2, 2, 2, 2, 2; 2, 2, 2, 2, 3; 2, 3, 3, 3; 2, 2, 3, 5; 2, 2, 2, 3, 3.

170. 2, 2, 2, 2, 2, 3; 3, 5, 7; 2, 2, 3, 3, 3; 2, 2, 2, 3, 5; 2, 2, 2, 2, 3, 3.

171. 2, 3, 3, 3; 3. 7; 2, 2, 3; 2, 3, 5; 2, 2, 3, 3.

172. 2, 2, 2, 5; 2, 5, 11; 3, 7, 13; 5, 11, 17.

173. 2, 3, 19; 2, 2, 2, 2, 5; 2, 2, 3, 7; 2, 5, 19.

174. Composite: 16,18, 21, 25, 36, 44, 48, 49. Prime: 13, 23, 29, 37.

175. 5, 5; 2, 3, 11; 3, 3, 11; 2, 2, 43; 2, 2, 2, 5, 5; 2, 2, 2, 17.

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176. 17360 lb.

177. 12240 yd.

178. $18.70.

179. $\$60\frac{4}{10}$.

180. $\$293\frac{1}{4}$.

181. $\$19\frac{1}{8}$.

182. $\$121\frac{3}{8}$.

183. $\$188.08\frac{1}{4}$.

184. $\$539.062\frac{1}{4}$.

185. $\$187.65\frac{5}{8}$.

186. $\$4.46\frac{1}{4}$.

187. $18.228.

188. $36.

189. $14.28.

190. $20.77.

191. $988\frac{4}{5}$; 351.

192. 4088; $1779\frac{5}{9}$.

193. 2839; $666\frac{2}{3}$.

194. 760; $966\frac{4}{17}$.

195. 2025 inches.

196. 2000 pounds.

197. 249 yards.

198. $243\frac{3}{8}$ tons.

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199. $\frac{128}{189}$.

200. $\frac{88}{96}$.

201. $\frac{192}{315}$.

202. $\frac{9}{11}$.

203. $\frac{7}{8}$; $\frac{14}{15}$; $\frac{7}{12}$; $\frac{7}{27}$.

204. $\frac{21}{45}$; $\frac{21}{55}$; $\frac{21}{66}$; $\frac{21}{78}$.

205. $\frac{59}{72}$; $\frac{59}{80}$; $\frac{59}{112}$; $\frac{59}{128}$.

206. $\frac{3}{4}$; $\frac{21}{76}$; $\frac{7}{36}$.

207. $2\frac{3}{4}$; $1\frac{7}{9}$; $1\frac{1}{15}$.

208. $1\frac{55}{108}$; $1\frac{87}{126}$; $\frac{163}{216}$.

209. $3\frac{29}{30}$; $1\frac{54}{65}$; $1\frac{44}{75}$.

210. $1\frac{187}{224}$; $2\frac{1}{63}$; $1\frac{88}{128}$.

211. 39; $43\frac{1}{3}$; $34\frac{4}{5}$.

212. $2\frac{3}{4}$; $\frac{85}{207}$.

213. $131\frac{2}{3}$; $4\frac{87}{133}$.

214. 12; $\frac{253}{350}$.

215. $25\frac{47}{72}$; $1\frac{1}{6}$.
216. $\frac{6}{15}$; $36\frac{204}{475}$.
217. $\$1\frac{11}{20}$.
218. $\frac{4}{5}$ yards.
219. $\$1\frac{3}{8}$.
220. $.576.
221. $31\frac{3}{7}$ miles.
222. $\$1\frac{8}{15}$; $\$1\frac{88}{374}$.
223. $\$15\frac{5}{8}$.
224. $3.19.
225. $\$158\frac{5}{16}$.

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226. 26.
227. 36.
228. 9.
229. 5.
230. 17.
231. 99.
232. 7, 5, and 9 farms.
233. 20.
234. 27.
235. 14.
236. 35 pieces.
237. $6\frac{1}{4}$.
238. $\frac{1}{8}$.
239. $\frac{81}{121}$.
240. $\frac{6}{7}$.
241. $\frac{1}{2}$.

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242. 24080.
243. 38808.
244. 2520.
245. 3536.
246. 420.
247. 9576.
248. 2232.
249. 6800.
250. 3024.
251. 420.
252. 120 minutes.
253. 65 minutes.
254. 1400.
255. 222.
256. 3150.

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257. $\frac{225}{300}$; $\frac{80}{300}$; $\frac{228}{300}$; $\frac{175}{300}$.
258. $\frac{288}{336}$; $\frac{105}{336}$; $\frac{288}{336}$; $\frac{154}{336}$.
259. $\frac{594}{792}$; $\frac{462}{792}$; $\frac{440}{792}$; $\frac{288}{792}$.
260. $\frac{105}{112}$; $\frac{96}{112}$; $\frac{26}{112}$.
261. $\frac{450}{570}$; $\frac{342}{570}$; $\frac{75}{570}$; $\frac{456}{570}$.
262. $\frac{99}{231}$; $\frac{105}{231}$; $\frac{22}{231}$; $\frac{42}{231}$.
263. $\frac{220}{495}$; $\frac{429}{495}$; $\frac{594}{495}$; $\frac{180}{495}$.
264. $1\frac{13}{30}$; $3\frac{1}{36}$.
265. $1\frac{375}{418}$; $1\frac{17}{42}$.
266. $1\frac{60043}{132250}$; $1\frac{113}{288}$.
267. $1\frac{196}{4725}$; $1\frac{18}{19}$.
268. $2\frac{206}{455}$; $1\frac{2008}{2145}$.
269. $3\frac{4504}{4403}$; $2\frac{1}{10}$.
270. $\frac{42}{175}$; $\frac{28}{403}$; $\frac{108}{667}$.
271. $\frac{844}{855}$; $\frac{3}{56}$; $\frac{109}{325}$.
272. $2\frac{211}{440}$.
273. $1\frac{108}{255}$.
274. $7\frac{13}{24}$.
275. $6\frac{888}{1260}$.
276. $1\frac{23}{40}$.
277. $1\frac{248847}{360360}$.
278. $4\frac{13}{18}$.
279. $28\frac{47}{90}$.
280. $\frac{5}{42}$.
281. $\frac{10}{21}$.
282. $\frac{5}{42}$.
283. $6\frac{39}{40}$.
284. $4\frac{445}{544}$.
285. $1\frac{17}{45}$.
286. $\frac{41}{2800}$.
287. $7\frac{15}{16}$.

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288. $\frac{5}{8}$; $\frac{4}{9}$; $\frac{16}{21}$.
289. $\frac{7}{11}$; $\frac{8}{17}$; $\frac{11}{20}$.
290. $\frac{35}{114}$; $\frac{7}{8}$; $\frac{288}{385}$.
291. $\frac{13}{17}$; $\frac{7}{13}$; $\frac{77}{91}$.
292. $\frac{3}{4}$; $\frac{111}{121}$; $\frac{9}{11}$.
293. $\frac{8}{9}$; $\frac{11}{101}$; $\frac{113}{764}$.
294. $\frac{11}{14}$; $\frac{61}{254}$; $\frac{191}{270}$.
295. $\frac{19}{24}$; $\frac{7}{23}$.
296. $\frac{81}{864}$; $\frac{111}{1098}$.
297. $\frac{1422}{2587}$; $\frac{97}{101}$.
298. $\frac{41}{329}$; $\frac{827}{7887}$.
299. $\frac{13}{131}$; $\frac{121}{486}$.
300. $\frac{11}{13}$; $\frac{19}{21}$.
301. $\frac{37}{41}$; $\frac{2887}{3218}$.
302. $\frac{22988}{44770}$; $\frac{741868}{988933}$.
303. $\frac{4}{7}$; $\frac{211}{2311}$.
304. $\frac{58}{75}$.
305. $\frac{55}{72}$; $\frac{888}{1210}$; $\frac{478}{1288}$.
306. $\frac{207}{1180}$; $\frac{307}{56}$; $\frac{247}{1144}$.
307. $\frac{1255}{336}$; $\frac{5955}{957}$.
308. $\frac{2460}{1}$; $\frac{210488}{88}$.
309. $1\frac{19}{72}$.
310. $1\frac{13}{20}$.
311. $1\frac{61}{140}$.
312. $1\frac{1}{25}$.
313. $14\frac{444444}{1000000}$.
314. $74\frac{2288}{3465}$.
315. $29\frac{19}{24}$.
316. $46\frac{888}{1000}$.
317. $32\frac{168}{175}$.
318. $25\frac{44}{111}$.

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319. $154\frac{51}{506}$.
320. $49\frac{17}{56}$.
321. $91\frac{1}{3^3}$.

322. $167\frac{249}{840}$.
323. $50\frac{211}{3465}$.
324. $31\frac{15}{17}$.
325. $38\frac{4008}{10000}$.
326. $55\frac{250}{2387}$.
327. $25\frac{245}{4819}\frac{2408}{9639}$.
328. $12\frac{2345}{2520}$.
329. $\frac{5}{7}\frac{2}{2}$; $1\frac{1}{2}$.
330. $4\frac{1}{10}$; $1\frac{35}{36}$.
331. $11\frac{3}{4}$; $8\frac{103}{192}$.
332. $5\frac{1}{24}$; $\frac{41}{100}$.
333. $6\frac{12}{17}$; $1\frac{81}{140}$.
334. $7\frac{16}{21}$; $12\frac{118}{504}$.
335. $35\frac{98}{77}$; $8\frac{78}{75}$.
336. $10\frac{17}{20}$; $6\frac{56}{99}$.
337. $6\frac{9}{13}$; $17\frac{34}{47}$.
338. $\frac{185}{392}$; $3\frac{31}{72}$.
339. $1\frac{61}{264}$; $\frac{13}{15}$.
340. $3\frac{89}{126}$; $\frac{251}{500}$.
341. $4\frac{41}{110}$; $8\frac{7}{19}$.
342. $\frac{7}{8}$; $4\frac{61}{315}$.
343. $5\frac{19}{24}$; $11\frac{6}{23}$.
344. $13\frac{28}{35}$; $11\frac{87}{70}$.
345. $12\frac{119}{210}$.
346. $\frac{1}{6}$.
347. 1.
348. $\frac{12}{36}$.
349. 0.
350. 0.
351. $\frac{559}{5184}$.
352. $\frac{9}{5\,80}$.
353. $\frac{17}{72}$.

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354. $\frac{71}{297}$.
355. $4\frac{18}{35}$.
356. $6\frac{15}{60}$.
357. $8\frac{157}{420}$.
358. $1\frac{13866}{32112}$.
359. $1\frac{17}{60}$.
360. $3\frac{9}{20}$.
361. $4\frac{235}{252}$.

362. $1\frac{5}{18}$.
363. $\frac{97}{120}$.
364. $1\frac{13}{15}$.
365. $\frac{289}{17}$.
366. $6\frac{1}{15}$.
367. $\frac{1}{30}$.
368. $9\frac{7}{24}$ inches.
369. $1\frac{1}{30}$ cents.
370. $\frac{1}{8}$.
371. $134\frac{9}{16}$ lb.
372. $\frac{65}{1008}$.

Page 49.

373. $61\frac{3}{8}$ miles.
374. $216\frac{59}{88}$ miles.
375. $25\frac{11}{24}$ miles north.
376. $\frac{240}{175}$.
377. $6\frac{38}{10}$ ft.
378. $\frac{7}{12}$ ft.
379. $8\frac{17}{24}$ miles.
380. $664\frac{103}{112}$.
381. $149\frac{14}{51}$ miles.
382. $1712\frac{11}{24}$ ft.
383. $\frac{71}{2}$ inches.
384. $\frac{11}{20}$ less than 2. $\frac{9}{20}$ more than 1.
385. $\frac{1}{2}$.

Page 50.

386. 1.
387. $3\frac{87569}{138860}$.
388. $4\frac{811999}{1441144}$.
389. $\frac{149}{450}$.
390. $\frac{7}{30}$.
391. $\frac{1512}{1825}$.
392. $26\frac{13}{84}$.
393. $1\frac{293}{990}$.
394. $3\frac{178}{360}$.
395. $\frac{2785}{2592}$.
396. $\frac{27}{200}$.
397. $48\frac{858}{900}\frac{59}{900}$.
398. $92\frac{3383}{4800}\frac{83}{48}$.
399. $2\frac{8}{15}$.
400. $\frac{3}{350}$.
401. $\frac{346}{175}$.
402. $12\frac{78}{375}$.
403. $1\frac{1}{4}$.
404. $6\frac{2}{11}\frac{0}{25}\frac{5}{6}$.
405. $\frac{7}{16}$.
406. $19\frac{3}{4}$.
407. $\frac{2579}{3200}$; $\frac{681}{3200}$
408. $\frac{59}{119}$; $\frac{25}{119}$.

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409. $\frac{217}{60}$.
410. $\frac{5}{1}$.
411. $24\frac{4}{5}$.
412. $99\frac{1}{4}$.
413. $\frac{13}{18}$; $\frac{21}{10}$.
414. $\frac{128}{635}$.
415. $9\frac{83}{35}$.
416. $4\frac{59}{655}$.
417. $\frac{3}{5}$.
418. $1\frac{2}{3}\frac{2}{3}\frac{2}{3}\frac{8}{3}$.
419. $\frac{55}{42}$.
420. $1\frac{307}{1313}$.
421. $244\frac{1}{80}$.
422. $583\frac{1}{4}$.
423. $3\frac{333}{400}$.
424. $3\frac{3}{14}$.
425. $2\frac{3}{9}\frac{3}{9}\frac{4}{8}\frac{8}{1}$.
426. $1\frac{1}{12}\frac{0}{0}\frac{7}{9}\frac{8}{6}$.
427. $1\frac{4}{1}\frac{6}{3}\frac{8}{6}\frac{3}{2}$.
428. $\frac{25}{63}$.
429. $18\frac{47}{60}$.
430. $\$2.04\frac{1}{6}$.

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431. $11\frac{91}{144}$.
432. $\$4\frac{3}{80}$.
433. $3\frac{97}{624}$.
434. 8 cents.
435. $\frac{6}{2}\frac{4}{8}\frac{5}{2}\frac{5}{1}$.
436. $\frac{11}{99}$.

437. $\frac{2}{3}\frac{7}{8}\frac{7}{0}\frac{9}{7}\frac{8}{2}$.
438. $2416\frac{5}{1}\frac{6}{2}\frac{8}{0}\frac{8}{8}$.
439. $\frac{2}{2}\frac{5}{5}\frac{5}{8}$.
440. $4\frac{8}{1}\frac{8}{2}\frac{8}{7}$.
441. 69.
442. $7\frac{1}{9}$.
443. $\frac{1}{4}\frac{9}{4}\frac{9}{1}$.
444. $\frac{1}{1}\frac{4}{5}$.
445. $\frac{9}{1}\frac{7}{8}\frac{7}{8}\frac{8}{8}$.
446. $\frac{8}{1}\frac{0}{9}\frac{0}{4}\frac{9}{0}$.
447. $71\frac{1}{3}$ cents.
448. 8 suits, $4\frac{1}{8}$ sq. yd. rem.
449. $\frac{2}{3}\frac{8}{8}$.
450. $19\frac{1}{2}\frac{1}{0}$.
451. $\$6.00\frac{8}{1}\frac{7}{4}\frac{7}{5}$.
452. $\frac{3}{8}\frac{4}{3}\frac{8}{3}$; $\frac{2}{6}\frac{0}{7}\frac{8}{0}$; $\frac{1}{3}\frac{8}{7}\frac{8}{8}\frac{5}{3}$.
453. $21\frac{5}{9}$.
454. $5\frac{2}{2}\frac{5}{7}\frac{7}{2}$.

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455. $\$86.92\frac{3}{4}\frac{8}{7}$.
456. $84\frac{6}{9}\frac{8}{2}$ hours.
457. $\$62\frac{3}{1}\frac{8}{1}\frac{8}{5}$.
458. $49\frac{5}{1}\frac{7}{0}\frac{9}{6}\frac{4}{4}$ miles.
459. 882 pounds.
460. $\$5.71\frac{4}{8}$.
461. 210 hours.
462. $\$136\frac{2}{3}\frac{8}{2}$.
463. 5400 minutes.
464. $14628\frac{4}{7}$ ounces.
465. $\$366\frac{6}{5}\frac{6}{9}$.
466. $\frac{1}{3}\frac{1}{4}$.
467. $\frac{3}{2}\frac{8}{2}$.
468. $87\frac{1}{2}$ pounds.
469. 60.
470. $\frac{1}{1}\frac{1}{2}$.
471. 44720.

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472. $\frac{2}{3}\frac{2}{1}\frac{2}{5}$.
473. $5\frac{1}{6}\frac{1}{3}\frac{1}{7}\frac{1}{5}\frac{6}{0}\frac{4}{0}\frac{8}{0}\frac{3}{0}$.
474. $\frac{1}{8}$.
475. 98 bottles.
476. $5\frac{4}{1}\frac{4}{0}$.
477. $33\frac{1}{3}$.
478. 5214 pounds.
479. $\frac{1}{1}\frac{1}{2}$.
480. 720.
481. $\frac{1}{8}$.
482. $1\frac{2}{2}\frac{2}{3}$.
483. $\frac{6}{8}$.
484. $\$150.42\frac{8}{7}$.
485. $23\frac{2}{3}\frac{1}{6}\frac{4}{9}$ hours.
486. $19\frac{1}{4}$.
487. $1\frac{1}{3}$.
488. $1\frac{1}{3}$.
489 A's gain, \$2.52; B's gain, \$7.44.
490. \$.60 for a girl; \$.75 for a boy.
491. 117.
492. 80 sheep.

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493. 327 acres.
494. \$1.26.
495. 7920 times.
496. \$20740.
497. $2\frac{8}{2}\frac{8}{5}$ acres.
498. $\frac{7}{1}\frac{7}{8}$.
499. $\frac{4}{6}\frac{9}{0}\frac{9}{0}$.
500. $188\frac{8}{1}\frac{8}{8}$, $244\frac{1}{1}\frac{1}{2}$.
501. $6\frac{2}{3}$.
502. $301\frac{2}{3}$.
503. \$105.
504. \$61200.
505. $89\frac{1}{2}\frac{7}{0}$ acres.
506. $\frac{1}{1}\frac{1}{7}\frac{2}{5}$.

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507. $\frac{2}{8}$; $\frac{2}{3}$.
508. $\frac{7}{1}\frac{7}{8}$; $\frac{5}{2}\frac{5}{7}$.
509. $\frac{3}{1}\frac{8}{5}\frac{9}{4}\frac{9}{7}$; $\frac{1}{3}\frac{5}{8}\frac{4}{8}\frac{7}{0}$.
510. $\frac{1}{4}\frac{2}{1}$; $\frac{1}{4}\frac{2}{1}\frac{0}{0}$.
511. $\frac{2}{7}\frac{6}{5}$; $\frac{7}{7}\frac{7}{2}$.
512. $\frac{5}{2}\frac{5}{0}\frac{8}{8}$; $\frac{2}{5}\frac{0}{8}\frac{8}{5}$.
513. $\frac{7}{2}\frac{7}{4}\frac{8}{8}$; $\frac{2}{4}\frac{4}{9}$.
514. $\frac{1}{1}\frac{1}{5}$; $\frac{8}{2}$.
515. $\frac{5}{2}\frac{5}{0}\frac{4}{6}\frac{0}{9}$; $\frac{5}{1}\frac{8}{9}\frac{8}{0}$.
516. $\frac{1}{7}\frac{8}{1}$; $\frac{6}{8}\frac{4}{1}$.
517. $\frac{1}{3}$.
518. $\frac{1}{3}$.
519. $\frac{1}{1}\frac{8}{8}$.
520. $\frac{5}{1}\frac{5}{2}$.
521. $\frac{8}{5}$.
522. $\frac{4}{8}\frac{4}{6}\frac{8}{1}\frac{8}{8}$.
523. $\frac{1}{1}\frac{1}{7}\frac{7}{7}\frac{2}{4}\frac{8}{0}$.
524. $\frac{6}{5}\frac{8}{0}\frac{8}{0}\frac{4}{1}$.
525. $\frac{3}{6}\frac{4}{5}\frac{4}{3}\frac{7}{4}$.
526. $\frac{2}{8}\frac{2}{3}$.
527. $\frac{1}{6}\frac{8}{4}\frac{8}{2}\frac{9}{6}\frac{1}{0}$.

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528. 1155 yards.
529. 147 miles.
530. 127 animals.
531. \$52.
532. $\$13.96\frac{4}{1}\frac{4}{1}$.
533. \$14.82.
534. $16\frac{4}{5}$ miles.
535. 476 birds.
536. $\$22\frac{1}{1}\frac{1}{7}\frac{8}{5}$.
537. $\$5710\frac{2}{5}$.
538. $\$16526\frac{1}{1}\frac{0}{8}\frac{6}{9}$.
539. $2444\frac{4}{5}$ yards.
540. $145\frac{1}{1}\frac{1}{5}$.
541. \$15000.
542. \$22.55.
543. $\$259.63\frac{7}{1}\frac{7}{1}$.
544. $\$151.66\frac{2}{3}$.

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1. \$14.724.
2. \$1016.05.
3. \$18920.

4. $1326.74.
5. $793.25.

Page 59.

6. $830.25.
7. $4387.50.
8. $64.53.
9. $3693.
10. $2569.75.
11. $587.
12. $938.90.
13. $283.50; cash $197.35.
14. $61.22, 109 lb. but.

Page 60.

15. $3389.25; 1039 lb. tea.
16. $67000; 240 tons steel rails.
17. $20280; cash $280.
18. $202.75; cash $38.35.
19. $93.25; balance due $7.95.

Page 61.

1. 3091 d.
2. 2316 s.
3. 13230 far.
4. 33858 d.
5. 73845 far.
6. 15311 s.
7. 3969 s.
8. 450 far.
9. 167 books.
10. 94 boxes.
11. £4 16 s. 4 d.
12. £23 8 s.
13. £6 15 s. 7 d. 2 far.
14. 21 s. 4 d.
15. 25 s. 10 d. 2 far.
16. 23 g. 17 s.
17. 1065 d.
18. 301 guineas.
19. 23 s. 10 d.
20. 3 cows.

Page 62.

21. 13314 lb.
22. 379206 oz.
23. 4295 cwt.
24. 22400 oz.
25. 2 cwt. 6 oz.
26. 32 T. 52 lb.
27. 4 T. 62 lb. 8 oz.
28. 6 T. 6 cwt. 40 lb.
29. 40 lb. 2 oz.
30. $2205.
31. $43.20.
32. $153.
33. $1.44.
34. $11\frac{2}{10}$ cents.
35. $150.
36. 71328 gr.
37. 34896 gr.
38. 1900 pwt.
39. 3672 gr.
40. 4 lb. 15 pwt.
41. 9 lb.
42. 345 lb.
43. 5 oz. 5 pwt.
44. 30 oz. 12 pwt.
45. $93.10.
46. $33228.

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47. 8940 gr.
48. 1047 scruples.
49. 1224 drachms.
50. 285 scruples.
51. 2 ℔ 9 ℥ 6 ʒ.
52. 22 ℔ 5 ℥ 5 ʒ 2 ℈.
53. 10 ℥ 5 ʒ 1 ℈.
54. 35 ℥ 5 ʒ.
55. 9 ℔.
56. 100 ʒ.
57. 644 doses.
58. 56 doses.
59. 8750 pills.
60. 1086 pt.
61. 277 qt.
62. 1100 pk.
63. 37 pk.
64. 90 pk.
65. 157 bu. 2 pk.
66. 20 bu. 3 pk.
67. 203 pk.
68. 46 pt.
69. $67.20.
70. $56.
71. $13.
72. $22.50.
73. $100.

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74. 532 gi.
75. 587 pt.
76. 2870 qt.
77. 28 gal.
78. 13 cents.
79. $27\frac{1}{2}$ cents.
80. $43.92.
81. 5 cents a pint.
82. $40.32.
83. $1.20 per qt.
84. 32 bottles.
85. 317994 inches.
86. 265993 feet.
87. $5725\frac{1}{2}$ ft.; 68706 in.
88. 6690 in.
89. 12501 yd. 1 ft. 6 in.; 37504 ft. 6 in.
90. 2880 rd.
91. 66 rd.
92. 6 miles.
93. 333 rd. 1 yd. 2 ft. 6 in.
94. 6 miles.
95. 1032 yd.
96. 46464 steps.

Page 65.

97. 1 A. 56 sq. rd. 21 sq. yd. 5 sq. ft.
98. 64 A.
99. 53 sq. rd. 10 sq. yd. 108 sq. in.
100. 3872 lots.
101. 60217344000 sq. in.
102. 3 sq. rd. 29 sq. yd. 2 sq. ft. 36 sq. in.
103. 29040 sq. yd.
104. 1 A. 40 rd.
105. 2994 sq. ft. 108 sq. in.
106. 2 sq. mi. 51200 sq. rd.
107. $881280.
108. 302½ days.
109. 100 days.
110. 682⅔ days.
111. $16000.
112. 2490¾ boards.
113. 65½¼ pieces.
114. 3$\frac{3}{10}$ ft.
115. 243 sq. in.

Page 66.

116. 793152 cu. in.
117. 22464 cu. in.
118. 414720 cu. in.
119. 1683 cu. ft.
120. 32 perches.
121. 11 cu. ft.
122. 97 cu. yd.
123. 10996$\frac{54}{231}$ gal.
124. 76788 lb.
125. $687.50.
126. $39.84.
127. $14.85.
128. 2522880000 sec.
129. 131784 hr.
130. 493500 minutes (342 days 17 hr.)
131. 2 days 3 hours.
132. 164 days 10 hours 40 minutes.
133. 5 years 275 days.
134. 31536000 sec.; 7948800 sec.
135. 7 days 7 hours.
136. 3 hours 55 min. 5$\frac{11}{13}$ seconds.

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137. 236820 seconds.
138. 4713 minutes.
139. 5400 minutes.
140. 18 minutes.
141. 21 degrees.
142. 24 degrees.
143. $\frac{19}{144000}$.
144. 1134000 seconds.
145. 416$\frac{4}{7}$ miles (69$\frac{1}{6}$ mi. = 1°).
146. 541$\frac{3}{7}$ miles (69$\frac{1}{6}$ mi. = 1°).
147. $\frac{33}{4320}$ miles (69$\frac{1}{6}$ mi. = 1°).
148. 6225 miles.
149. 9600.
150. 60 dozen.
151. 162 score.
152. 230 screws.
153. 288000 sheets.
154. 32 pens.
155. $9.37½.
156. 390 reams, 300 sheets.
157. $3280.50.

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158. £65 3 s. 8 d. 1 far.
159. £443 3 s. 10 d. 3 far.
160. 1159 T. 17 cwt. 84 lb. 7 oz.
161. 1076 T. 18 cwt. 62 lb. 14 oz.
162. 54 lb. 4 oz. 2 gr.
163. 60 lb. 7 oz. 10 pwt. 10 gr.
164. 61 ℔ 2 ℥ 2 ℈ 17 gr.
165. 82 ℔ 5 ℥ 6 ℥ 1 ℈ 8 gr.
166. 53 bu. 1 qt. 1 pt.
167. 81 bu. 2 pk. 6 qt. 1 pt.
168. 52 gal. 2 gi.
169. 97 gal. 1 qt. 3 gi.
170. 25 mi. 231 rd. 1 yd. 2 ft.
171. 46 mi. 358 A. 107 sq. rd. 16 sq. yd. 3 sq. ft. 135 sq. in.
172. 42 cu. yd. 11 cu. ft. 72 cu. in.
173. 8 yr. 7 mo. 10 da 11 hr. 40 min 37 sec.
174. 329° 44′ 13″.
175. 157 cd. 8 cu. ft.

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176. £6 19 s. 10 d. 3 far.
177. £18 3 s. 9 d. 1 far.
178. 14 T. 4 cwt. 97 lb. 10 oz.
179. 15 T. 2 cwt. 3 lb. 1 oz.
180. 5 oz. 12 pwt. 8 gr.
181. 1 lb. 5 oz. 1 pwt. 15 gr.
182. 6 ℔ 10 ℥ 6 ℥ 1 ℈ 8 gr.
183. 3 inches.
184. 1 ℔ 5 ℥ 3 gr.
185. 1 mi. 164 rd. 3 yd. 2 ft. 3 in.
186. 240 rd. 1 yd. 1 ft. 2 in.
187. 4 sq. mi. 27 A. 3 sq. rd.
188. 22 A. 1 sq. rd. 2 sq. yd. 1 sq. ft. 48 sq. in.
189. 8 cd. 60 cu. ft. 128 cu. in.
190. 15 gal. 3 qt. 1 pt.
191. 7 bu. 7 qt. 1 pt.
192. 4081 hours.
193. 7 square inches.
194. 162° 16′ 24″.
195. 465 cu. yd. 25 cu. ft. 990 cu. in.
196. 1 yr. 5 mo. 29 da.
197. 3 ℥ 6 ℥ 5 gr.

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198. £10400 4 s. 2d 2 far.
199. £37 4 s.

200. 3 lb. 8 oz. 2 pwt.
201. 6 T. 6 cwt. 93 lb. 11 oz.
202. 228 gal. 1 pt.
203. 7 ℔ 3 ℥ 4 ʒ 2 ℈ 15 gr.
204. 1 mi. 83 rd. 3 yd. 10 in.
205. 279 mi. 198 rd.
206. 223 gal. 2 qt. 2 gi.
207. 598 bu. 3 pk.
208. 151 A. 49 sq. rd. 2 sq. yd. 6 sq. ft. 108 sq. in.
209. 234 cu. yd. 1408 cu. in.
210. 2 cu. yd. 32 cu. in.
211. $303\frac{5}{77}$ gallons.
212. $102\frac{92058}{107521}$ bu.
213. 1152 cubic feet.
214. 569 gal. 1 quart.

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215. £4 17 s. 6 d.
216. £10 11 s. 7 d. $2\frac{1}{5}$ far.
217. 1 T. 14 cwt. 33 lb. $4\frac{4}{9}$ oz.
218. 8 ℥ 3 ʒ 1 ℈ $17\frac{1}{3}$ gr.
219. 33 bu. 2 pk. 6 qt. $1\frac{1}{6}$ pt.
220. 70 A. 22 sq. yd. $1\frac{32}{55}$ sq. in.
221. 3 T. 15 cwt. 10 lb.
222. 13 bu. 1 pk. $3\frac{1}{21}$ qt.
223. 5° 16′ $23\frac{3}{4}$″.
224. $15\frac{9}{40}$ grains.
225. $1\frac{22}{31}$ gills.
226. 10 A. 115 sq. rd. $2\frac{43}{52}$ sq. yd.
227. $8\frac{61482}{107521}$ bu.
228. $164025\frac{45}{187}$ lb.

229. 501 cu. ft. $175\frac{1}{2}$ cu. in.
230. 225 A. 9 sq. rd. $13\frac{3}{4}$ sq. yd.
231. 16 hours.
232. $16\frac{593}{4963}$ hhd.
233. $322\frac{2}{19}$ yards.

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234. 3 hr. 30 min. 25 sec.
235. 5 hr. 24 min. $52\frac{3}{5}$ sec.
236. 6 hr. 50 min. $16\frac{14}{15}$ sec.
237. 5 hr. 36 min. $53\frac{1}{5}$ sec.
238. 6 hr. 41 min. 28 sec.
239. 33° 42′.
240. 97° 26′ 15″.
241. 79° 6′ 45″.
242. 73° 48′ west.
243. 168° 34′.
244. 106° 18′ 15″.
245. 101° 15′.

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29. 1575.355671.
30. 1472.04356.
31. 8048.539142.
32. 956.350155.
33. 669.10913.
34. 771.53408.
35. 1418.48196064.
36. 694.9032948.
37. 375.169255.
38. 198.004168.
39. 172.321351.
40. 6876.0971939216.
41. 440.92524.
42. 800.07420231.
43. 727.36656365.
44. 742.0492483.
45. 332.718692.
46. 266.886627012.
47. 2467.8028085.
48. 1438.2341655.
49. 491.714246.
50. 2022.56294789.
51. 900.738202.
52. $295.54.
53. $2259.6501.

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54. 46.5068.
55. 903.861339.
56. 54.339179.
57. 17.30725.
58. 13.45756.
59. 293.136346.
60. 15.984.
61. 1.30622.
62. 888.75406.
63. 193.47604.
64. 10.6016.
65. 70.0918023.
66. 6.386783.
67. 7.05599.
68. 4.5061442.
69. 4.58963.
70. 88.3343054.
71. 9.363616.
72. 85.77213.
73. 90.8414658.
74. 2.376266.
75. 712.7027114.
76. .901.
77. 216.783.
78. 1.001.
79. 5.305095.
80. 4.9608.
81. 99.99.
82. 899.1.

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83. 2656.5; .0025125
84. 2523.232; 8.1216144.
85. 2533.135; 32.4036001.
86. 46751.042; 34110.25.
87. 650.265; 750.03200018.
88. 5401.2536; .000008235.
89. 69.253422; 41.328264.
90. 2.03160; .0180008.

91. 490.867395018; 360.0600025.
92. 453390.70947264; 8103.6004.
93. 66221.227926; 1612.9.
94. 9423.63601008; 195.832311.
95. 15330.425; .00004.
96. 98.740833; 1.30039.
97. 331833.984; .05.
98. 421.781; 22.876.
99. .028376604; .000555.
100. 6.7243605; .025.
101. 3051.5892; 28.9.
102. 11031.3293675; 557.015.
103. 15380.896; 1.
104. 572.974103; .00000009.
105. 5096.12461067; 6265.009.
106. 2200.207976; 65.610081.
107. 148.37.
108. 61.5. [387.
109. 105052.500774
110. 1.
111. 100.

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112. 7.01. 701.
113. 491.38+; .49138+.
114. 6.78+; .0678+.
115. .654+; 654.56+.
116. 44.4+; .00444+.
117. 11.78547+; 117854.7+.
118. 7654.82+; 2029.25.
119. 3828221.78+; .382822178+.
120. 10000; 10000000.
121. 7.01; 70.1.
122. 4.99852+; 499850.059+.
123. 114.2+; .001142+.
124. .25; .25.
125. 1.542+; .1542+.
126. 6.159+; 100.
127. 4.041+; 10000000.
128. 41.0002+; 410002.8+.
129. 79.984+; 799840.+.
130. 13.728+; 137.28+.
131. 3.5061463+; 35061463.+.
132. 27.702+; .01.
133. .5; 50000.
134. 2.5.
135. 18.363+.
136. 32.
137. 198400.0168.
138. .00101+.
139. .000001.

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140. $\frac{63}{10}$.
141. $\frac{25}{4}$.
142. $\frac{1}{200}$.
143. $\frac{33}{80}$.
144. $\frac{1829}{2000}$.
145. $\frac{353}{40}$.
146. $\frac{171}{100}$.
147. $\frac{1568}{25}$.
148. $\frac{73}{10}$.
149. $\frac{15537}{2500}$.
150. $\frac{1482}{10000}$.
151. $\frac{2107}{200}$.
152. $\frac{2}{3}$.
153. $\frac{7}{15}$.
154. $\$\frac{2}{3}$.
155. $\$\frac{1}{20}$.
156. $\frac{1631}{1200}$.
157. $\frac{5}{96}$.
158. $\frac{1}{2}$ T.
159. $\frac{1}{3}$.
160. $\frac{1}{16}$.
161. $\frac{1}{14}$.
162. $\frac{1}{15}$.
163. $\frac{1}{19}$.
164. $\frac{3}{8}$.
165. $\frac{1}{13}$.
166. $\frac{11}{16}$.
167. $\frac{1}{8}$.
168. $\frac{19}{18}$.
169. $\frac{121}{160}$.
170. $\frac{13}{1800}$.
171 $\frac{1}{16}$.
172. $\frac{991}{30}$.

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173. .6.
174. .8.
175. 1.555.
176. .28.
177. .96875.
178. .140625.
179. .042625.
180. .2175.
181. .3125.
182. .11328125.
183. .587890625.
184. .48.
185. .947913/8.
186. .685.
187. 1.5811+.
188. 1.90625.
189. .9375.
190. .11458 1/3.
191. .96 3/8.
192. .45.
193. .5357 1/7.
194. .493 1/13.
195. .73 1/3.
196. .52.
197. 3.75.
198. 10.
199. 2.475.
200. .22265625.
201. $2\frac{3}{8} = 2.8\frac{3}{5}$.
202. .02078125.
203. 8.549.

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1. 15.1$\frac{1}{3}$ rd.
2. 1.1$\frac{8}{87}$ lb.
3. 2.4 pwt.
4. .96 sq. rd.
5. 1.6 ʒ.
6. 6.5 dimes.
7. .5$\frac{1}{8}$ cu. ft.
8. 6.6 sec.
9. .048 min.
10. .24 doz.
11. .088 yd.
12. .84 pt.
13. .16 pt.
14. 34.13$\frac{1}{3}$ sq. rd.
15. .192 ℈.
16. .6 gr.
17. 20 oz.
18. .4184 pt.
19. .16 pt.
20. 26.4 sec.
21. .895$\frac{15}{16}$ cu. ft.
22. 12.1 sec.
23. .355$\frac{85}{85}$ in.
24. .6375 ʒ.
25. .4 lb.
26. 5.5 gr.

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27. .03$\frac{7}{11}$ rd.
28. .0004375 T.
29. .0069$\frac{3}{9}$ ℔.
30. .002$\frac{1}{12}$ lb.
31. .009$\frac{7}{27}$ cu. yd.
32. .0078125 sq. mi.
33. .09375 gal.
34. .015625 bu.
35. .069$\frac{4}{8}$ gross.
36. £.0125.
37. .0006 E.
38. .000004$\frac{11}{216}$ da.
39. .0001$\frac{2}{13}$ T.
40. .001$\frac{1}{999}$ rd.
41. .66$\frac{2}{3}$ ʒ.
42. .0027$\frac{25}{384}$ cd.
43. .0009$\frac{7}{27}$ oz.
44. .006$\frac{22}{88}$ bbl.
45. .002$\frac{29}{48}$ bu.
46. .000023$\frac{4}{27}$ C.
47. .03 T.
48. .06$\frac{2}{3}$ lb.
49. £.00078125.
50. .001$\frac{511}{1089}$ sq. rd.
51. .07$\frac{7}{99}$ rd.
52. .00005208$\frac{1}{3}$ hr.
53. .0002$\frac{23}{176}$ mi.
54. .0125 double E.
55. .925 deg.
56. .1$\frac{9}{21}$ sq. rd.
57. .00017$\frac{86}{3267}$ A.
58. .07$\frac{27}{64}$ cd.
59. .000015$\frac{155}{1936}$ mi.

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60. 232 rd. 4 yd.
61. 1666 lb. 10$\frac{2}{3}$ oz.
62. 1 gal. 3 qt. 1 pt.
63. 18$\frac{2}{3}$ pt.
64. 7776 cu. in.
65. 407 A. 43 sq. rd. 19 sq. yd. 2 sq. ft. 36 sq. in.
66. 304 ℈.
67. 576 far.
68. 6 sq. ft. 108 sq. in.
69. 120 rd. 2 yd. 2 ft.
70. 4 hr. 40 min.
71. 5 ℥ 5 ʒ 4 gr.
72. 117 A. 136 sq. rd.
73. 11 cwt. 37.5 lb.
74. $24.67.
75. $.19$\frac{48}{128}$.
76. 22′ 50.5″.
77. 26 cu. ft. 1584 cu. in.
78. 8 ℥ 4 ʒ 1 ℈ 9$\frac{1}{3}$ gr.
79. 2 da. 21 hr. 50 min.
80. 1068$\frac{8}{9}$ ct.
81. 18094$\frac{2}{17}$ lb.
82. 3 cu. yd. 25 cu. ft. 1152 cu. in.
83. 6 s. 8$\frac{6}{7}$ d.
84. 14 pwt. 15 gr.
85. $.70$\frac{1}{3}$.
86. $.20$\frac{5}{8}$.

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87. $\frac{6613}{18480}$.
88. $\frac{2551}{4000}$ T.
89. $\frac{41}{72}$ ℔.
90. 4.641$\frac{2}{3}$ oz.
91. .46953125 sq. mi.
92. .646$\frac{18}{72}$ da.
93. .508$\frac{1}{3}$ deg.
94. £$\frac{11}{40}$.
95. $\frac{49}{1536}$.
96. $\frac{28}{88}$.
97. $\frac{25}{63}$.
98. 1.3.
99. $\frac{169}{6600}$.
100. .02$\frac{17}{192}$.
101. $\frac{451}{3888}$ cu. yd.
102. $\frac{3993}{8000}$.
103. .3475.
104. .8583$\frac{1}{3}$.
105. $\frac{93}{88}$.
106. $\frac{1883}{16644}$.
107. .74$\frac{64}{129}$.
108. .203$\frac{1867}{3000}$.
109. $19.20.
110. 19.75\frac{25}{1056}$.
111. $\frac{4284439}{5827746}$.
112. $.36.
113. $\frac{2}{125}$.

114. 1 A. 101 sq. rd. 7 sq. yd. $40\frac{1}{4}$ sq. in.

115. $69\frac{53}{117}$ A.

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1. $129.60
107.25
53.90
36.75
$327.50

2. $3.00
.42
$1.93\frac{1}{2}$
2.50
1.33
4.02
$13.20\frac{1}{2}$

3. $22.38\frac{1}{2}$
$6.09\frac{1}{2}$
10.20
11.25
8.25
$58.18

4. $77.25
$11.87\frac{1}{2}$
23.75
10.88
2.10
$125.85\frac{1}{2}$

5. $7.81\frac{1}{4}$
28.80
$72.62\frac{1}{2}$
74.25
8.40
135.00
$326.88\frac{1}{4}$

6. $56.00
2.08
1.56
$10.62\frac{1}{2}$
6.75
$77.01\frac{1}{2}$

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7. 6 hours $48\frac{1848}{6785}$ minutes.

8. $176.36\frac{1}{4}$.

9. $1915\frac{5}{18}$ lb. Troy.

10. 18600 grains.

11. $291.

12. $187\frac{3}{4}$ sq. yd.

13. $25.54\frac{11}{16}$.

14. $2456.63\frac{11}{128}$.

15. 106 spoons, and 2 oz. 6 pwt. of silver remaining.

16. $29.16\frac{2}{3}$.

17. $133\frac{1}{3}$ yd.

18. $5119.64\frac{4}{5}$.

19. $49.34+ gain.
$130\frac{213}{231}$ more quarts by wine measure.

20. $1701.5625.

21. $0.025.

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22. 17.1717017.

23. .00286656.
.00000041208.

24. $\frac{8881}{18000}$.

25. $.142857\frac{1}{7}$.

26. 64.89 miles.

27. 74.9.

28. $5.82\frac{3}{8}$.

29. 333399.9999993.

30. $303.85861\frac{1}{3}$.

31. 33449.9999885.

32. $1\frac{11}{35}$.

33. $165.260\frac{5}{37}$.

34. 1.725.
1.975.

35. 310.93360629.

36. $.829\frac{17}{27}$.

37. $.52\frac{284}{567}$.

38. $.46\frac{187}{303}$.

39. $.9143\frac{1}{9}$.
$.01\frac{482}{5143}$.

40. 48.6 tons.

41. $343.857+.

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42. $77\frac{1}{2}$ cords.

43. $.043\frac{101}{512}$.

44. £.0625.

45. $101.258+.

46. $5.184.

47. $.60\frac{5115}{8101}$.

48. 46 wk. 3 da. 22 hr. 40 min. 48 sec.

49. 2.8125 sq. yd.

50. £205 6 s. $4\frac{4}{5}$ d.

51. 14.996+ cords.

52. $1486.76+.

53. $467.157+.

54. $6\frac{9}{16}$ cords.

55. $9.25 gain.

56. $56.66\frac{2}{3}$.

57. $41\frac{5}{33}$ pieces.

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58. 48° 50′ of longitude east.

59. 9 mi. 227 rd. 4.75 yd.

60. $1367\frac{3}{16}$ lb., Apothecaries' weight.

61. $188.48+.

62. 175 bbl.

63. 969 lb. 14.2 oz.

64. 267.54+ hr.

65. $.889\frac{211111}{1500001}$.

66. 2.792+ qt.

67. $.7553\frac{1}{7}$.

68. 1609.3 meters.

69. 2.1748+ miles.

70. 9999.8+ sq. meters.

PART II.

GRADED PROBLEMS IN ARITHMETIC.

PERCENTAGE.

CASE I.

1. WHAT is 7 per cent. of $1000.50?

2. What is 9 per cent. of $1125.60?

3. What is 11 per cent. of $3000.18¾?

4. What is 5½ per cent. of 1137¼?

5. What is 6¼ per cent. of 219724?

6. Find 13% of 1825 pounds.

7. Find 17% of 397.5 tons.

8. Required 66⅔ per cent. of 3600 horses.

9. What is 12½% of 6¼% of 256 sheep?

10. What is 33⅓% of 66⅔% of 2700 men?

11. Find 8⅜% of 10 pounds 12 ounces of pepper.

12. What is 10¼ per cent. of 18 tons of coal?

13. What is 4½% of £125 9 s. 8½ d.?

14. How much is 25% gain on goods costing $3750?

15. How much is 18¾% loss on a horse costing $187.50?

16. If A pays his debts at the rate of 35 cents on the dollar, what does a creditor receive whose account is $2750.17?

17. What is 20% of 66⅔% of .25?

18. 15% of 24 hours is how many minutes?

19. 10% of the cost of a house is for bricks, at $10 per M; how many bricks were there, if the house cost $10000?

20. My height is 5 ft. 8½ in.; my youngest son is 30% less in height; what is his height?

21. What is 36% of 18 lb. 10 pwt. 10 gr. of gold?

CASE II.

22. What per cent. of 1.25 is $2.66\frac{2}{3}$?

23. What per cent. of $2.66\frac{2}{3}$ is 1.25?

24. What per cent. of \$120 is \$12.50?

25. What per cent. of 600 pounds is 6.25 pounds?

26. What per cent. of $3\frac{1}{4}$ is 100.125?

27. What per cent. of £200 10 s. 10 d. is £5 9 s. 9 d.?

28. What per cent. of 2170 is 3340?

29. What per cent. of 12000 is 120.5?

30. What per cent. of 200 acres is 15 acres 15 rods?

31. If I receive \$250 for collecting \$10000, what is the rate per cent.?

32. What per cent. of \$5 is 75 cents?

33. What per cent. of a barrel of flour is 25 pounds?

34. What per cent. of a day is 3 hr. 10 min. 20 sec.?

35. What per cent. of 100 miles is 10 mi. 40 rd. 2 ft.?

36. £11 11 s. 10 d. is what % of £12 12 s. 11 d.?

37. What per cent. of a short ton is the weight of a barrel of flour?

38. What per cent. can a merchant who owes \$16250 pay, if his property is worth \$2031.25?

39. What per cent. of .5236 is .7854?

40. A loss of 1 s. 2 d on the £ is a loss of what per cent.?

41. Sold goods for \$2870 that had cost \$2400; what per cent. was the profit?

42. Sold goods for \$2400 that had cost \$2870; what per cent. of the cost was the loss?

43. What per cent. of 720 is 20% of $\frac{3}{4}$ of 1440?

44. The base is \$840, and the percentage is \$2.73; what is the rate per cent.?

45. The base is \$3000, the percentage is \$153; what is the rate per cent.?

46. The base is $1\frac{5}{4}$ of the percentage; what is the rate per cent.?

47. What per cent. of 1.005 is $.007\frac{1}{2}$?

48. What per cent. of a number is 33% of $\frac{3}{7}$ of it?

CASE III.

49. 117 is $16\frac{2}{3}\%$ of what number?

50. $16\frac{2}{3}$ is 117% of what number?

51. $\$1\frac{1}{4}$ is $1\frac{3}{5}\%$ of how many dollars?

52. 2111 yards is 111% of how many yards?

53. .007 is 7% of what number?

54. The rate is $3\frac{1}{3}\%$, the percentage $6\frac{2}{3}$; what is the base?

55. 399 miles is $6\frac{1}{4}\%$ of how many miles?

56. 3 bu. 2 pecks is 9% of what quantity?

57. \$99.99 is 19% of my money, or 17% of B's money; what % of B's money is equal to mine?

58. $12\frac{1}{2}\%$ of 4% of my money is \$200; what is my money?

59. If I sell \$15000 worth of my property, the remainder will be worth 85% of the value of the whole property; what is the value of the whole?

60. The percentage is $11\frac{1}{9}$, the rate $44\frac{4}{9}\%$; what is the base?

61. If $12\frac{1}{2}\%$ of the distance from Philadelphia to New York is 11 mi. 199 rd. 5 yd. 1 ft. 6 in., what is the whole distance?

62. $33\frac{1}{3}\%$ of 45% of a certain sum is \$900; what is 100%?

63. 19 bushels are $15\frac{1}{2}\%$ of what number of bushels?

64. If a piece of gold is 18 carats fine, what is the percentage of alloy?

65. £25 4 s. 3 d. is 40% of how many pounds sterling?

66. The rate is 24%, the percentage $3\frac{1}{3}$; what is the base?

67. \$10 is 5% more than what sum?

68. \$10 is 5% less than what number of dollars?

69. $333\frac{1}{3}$ is $33\frac{1}{3}\%$ less than what number?

70. $333\frac{1}{3}$ is $33\frac{1}{3}\%$ more than what number?

71. I bought a farm for \$18000, which was 25% less than the price asked for it; what was asked for it?

72. \$30 is $12\frac{1}{2}\%$ more than $12\frac{1}{2}\%$ of how many dollars?

73. $\frac{2}{5}$ more than A's money is $\frac{3}{10}$ less than B's; A's money is what % of B's?

74. $\frac{5}{9}$ of Smith's money is $16\frac{2}{3}\%$ less than Brown's money, and they together own \$15015. How much does each own?

TRADE DISCOUNT.

75. SOLD an invoice of books at 20% from the list price, which was $1000. The books were marked to be sold at 10 and 10% off; how much was lost by my mistake?

76. Goods that cost $150 were marked to be sold at $250, subject to three discounts of 5, 10, and 15%; what was the rate per cent. of the deduction?

77. If I purchase goods at 20 and 20% discount, and sell at 20 and 10% discount on the original list price, what is my gain per cent.?

78. Bought paper at 15 and 10% discount, and sold it at 5 and 10% added to the original list price; what is my gain on an investment of $500? What is my gain per cent.?

79. Bought goods marked $48 per dozen at 25 and 25% off, and sold them at an advance of 15% on their cost to a merchant who retailed them at the original list price; what was his gain per cent.?

80. What is the net cash value of goods sold at a discount of 25%, the list price being $1537.50, and an additional discount of 5% being allowed for immediate payment?

81. Four discounts of 25% each were offered on an order for $10000 worth of slates. The buyer preferred to settle on the basis of 50 and 50% off; what did he gain by the transaction?

82. What rate of discount equals $33\frac{1}{3}$ and 10% off?

83. Goods marked to be sold at 40 and 10% discount were disposed of by an ignorant salesman at 50% from the list price; what was the loss on cash sales amounting to $15000, and what was the percentage of loss?

84. How much is saved on a purchase of $5000, list price, by accepting 15% discount instead of 5 and 5 and 5% discount?

85. Bought goods at a discount of 20 and 20%, and marked them so as to be able to give 20 and 20% off and still have a profit of 20%. What per cent. was my marking above cost?

PROFIT AND LOSS.

86. If I sell my house for \$3500, I lose 25%. What was the cost?

87. A man sold a horse for \$250, thereby losing $10\frac{1}{2}$%. What was the cost of the horse?

88. The selling price is \$750; the gain 30%. What was the cost?

89. The gain is $16\frac{2}{3}$%; the cost \$360. What is the selling price?

90. I sold wheat at a gain of $33\frac{1}{3}$%; the selling price was \$1 per bushel. What was the cost?

91. I bought a farm 20% below its real value, and sold it for \$6000, thereby gaining 20% on the purchase-money. What was the real value of the farm?

92. The loss is 20%; the selling price \$875. What was the cost?

93. The gain was 10% of the selling price; the cost was \$100. What was the selling price?

94. The loss was $16\frac{2}{3}$% of the selling price; the cost was \$168. What was the selling price?

95. If I sell goods that cost \$90 for \$137.50, what is the gain per cent.?

96. At what price must cloth, that cost \$3.50 per yard, be marked, that I may fall 20% and yet gain 20%?

97. If I fall 25% on goods that are marked 25% above cost, do I gain or lose, and how much per cent.?

98. I bought a horse for \$150, and sold him so that 25% of the money received was profit; how much did I receive for him?

99. If $\frac{3}{7}$ of the sale is gain, what is the gain per cent.?

100. If $\frac{2}{3}$ of the cost equals $\frac{4}{15}$ of the sale, what per cent. is the loss?

101. If Smith should sell his farm for \$3500, 20% of this money would be gain; would he gain or lose, and how much %, if he should sell his farm for \$2975?

102. If the cost is $16\frac{2}{3}\%$ less than the sale, what is the gain %?

103. If I sell $\frac{8}{11}$ of my goods at a gain of 10%, at what rate must I sell the remainder that there may be neither gain nor loss on the whole?

104. I bought grain at \$.75 per bushel, and sold it so that 10% of the selling price was equal to my loss; what per cent. did I lose on the cost?

105. If my profit equals 20% of the selling price, what per cent. of the cost is my gain?

106. If my loss equals 20% of the cost, what per cent. of my selling price does it equal?

107. A merchant sells cloth for $12\frac{1}{2}$ cents a yard less than it cost, and his loss is equal to 10% of the selling price; what was the cost of the cloth?

108. If I sell goods for 25% of their cost, what per cent. of my selling price equals my loss?

109. A grocer loses 5% of his sales in bad debts, and pays 5% for having his bills collected; what per cent. must he add to the cost that he may gain 20% on the whole cost?

110. The gain per cent. is 25, the selling price \$525; what is the cost?

111. The cost is $12\frac{1}{2}$ cents, the profit $3\frac{1}{8}$ cents; what is the rate per cent. of profit?

112. If I buy goods $33\frac{1}{3}\%$ below their value, and a discount of 5% is allowed to me for prompt payment, what per cent. is my profit, if I sell them at 10% above their value?

113. 20 cents profit on goods that cost \$.90 is equal to what per cent. of the selling price?

114. \$3000 is 20% more than the cost of A's house, and 40% less than the cost of his farm. If he sells his house for \$3000, how much money must he gain in selling his farm, that the rate of gain in both sales may be equal?

115. If Brown sells his horse for \$220, he gains 10%; what per cent. will he gain or lose if he sells it for 10% less than \$220?

COMMISSION AND BROKERAGE.

116. WHAT is the commission on \$1876.76 at $2\frac{1}{4}\%$?

117. What is the commission on the sale of 500 barrels of flour, at \$9.25 per barrel, at 5%?

118. What rate does a broker charge, who takes \$75 for selling \$1500 worth of goods?

119. A consignee sells goods to the amount of £500 12s. 9d.; what is his commission at $3\frac{1}{8}\%$?

120. Bought 100 bales of cotton, at \$125.25 per bale; what is my commission at $\frac{3}{8}\%$?

121. An agent receives \$7.25 commission on a sale of \$200 worth of furniture; what was the rate?

122. What is the commission on \$2777.77 at $\frac{1}{8}\%$?

123. The commission is \$182, the rate 5%; what is the amount of the sales?

124. The rate is $1\frac{1}{4}\%$, the amount of sales \$2500; what is the commission?

125. The sum to be invested, including the commission, is \$1000, the rate 3%; what is the commission?

126. The amount of sales is \$1110, the rate of commission $2\frac{1}{2}\%$; the net proceeds are invested in flour, the agent charging $2\frac{1}{2}\%$ for buying; what is the whole commission on sales and investment?

127. The brokerage for selling or buying is $\frac{1}{4}\%$; what will it cost to sell \$10000 worth of bonds and invest the net proceeds in stocks?

128. Sold sugar to the amount of \$1642, and invested the net proceeds, less $2\frac{5}{8}\%$ commission for buying, in tea at \$.75 per lb.; what is my commission in both transactions, the rate being the same in both?

129. The brokerage is \$83, rate $\frac{1}{2}\%$; what was the amount of my purchase, and what was the entire cost to my employer?

130. A broker charged \$142.50, at $\frac{3}{4}\%$, for selling goods; what was the amount of the sale?

STOCKS AND BONDS.

131. WHAT is the value of 150 shares of stock, at 25% discount, the par value of a share being $25?

132. Bought stock at 125 and sold it at 114; what per cent. do I lose?

133. What must I pay for 75 shares of stock at 95%, the par value of a share being $50, and brokerage ¼%?

134. The market value of a certain stock is $35; what is the discount, the par value being $50?

135. Bought stock at 98, and sold it at 103, brokerage in each transaction ¼%; what is the gain per cent.?

136. Bought $25000 U. S. bonds at 111½, and sold them at 114; how much did I gain, and what is my gain per cent.?

137. On 80 shares of stock, par $100, I paid $175 premium; what was the price of the stock per share?

138. Bought 12 shares of stock at 3% premium, brokerage ¼%, for $123.90; what was the par value of a share?

139. When Philadelphia City 6's are selling at 113, what face value can be purchased for $16950?

140. If stock sells at $11, the par being $50, what is the rate of discount?

141. What is the rate of premium on stock selling at $85½, par being $25?

142. My broker buys me 180 shares of Reading R. R. stock at $13, par $50, brokerage ¼%; what does the stock cost me?

143. 75 shares of stock at 113 were exchanged for 140 shares of another stock; what was the value of the latter per share?

144. What is the face value of stock purchased at 112½ for $11250?

145. I send to a broker $17692; part of it he invests in railroad stock at 103, retaining ¼% brokerage; with the remainder he purchases 96 shares of bank stock at 98, brokerage ¼%. How many shares of railroad stock, par $100, did he buy for me?

TAXES.

146. At a tax-rate of 21 mills on the dollar, what is the assessed value of a property that pays $125.25 tax?

147. Find the total tax on $10000 at $.015 per dollar, allowing 5% commission to be added for the collector.

148. The expenses of a city are $7500000 per annum, and the assessed valuation of its property $200000000; what must the tax-rate be, allowing 10% of the taxes not to be collected?

149. What is the tax, by the rate fixed in the last example, on property valued at $250000?

150. A tax of $.006 on the dollar produces $300000; what is the assessed valuation of the property?

151. How much tax will a man pay on $12500, if the rates are $1\frac{7}{8}\%$ for city tax, $\frac{3}{8}\%$ for State tax, and 1 mill on the dollar as a special tax for the year?

152. A township whose property was assessed at $1000000 wishes to build 3 school-houses, at a cost of $1200 each, the collector's commission being 5%; what must be the rate of taxation?

153. $1367875 is the amount of a tax in a certain town; the rate is $5\frac{1}{2}\%$, and the expense of collecting is $1\frac{1}{2}\%$, which is a part of the amount collected; what is the assessed value of the property?

154. What sum must be assessed to raise $100000 and pay the expense of collecting at 3%, the tax-rate being $1\frac{1}{8}\%$?

155. The expense of erecting certain public buildings is estimated at $15000000; what must be the annual rate % on an assessed valuation of $300000000, to finish the buildings in 10 years?

156. What is the rate of taxation in a city, when a house assessed at $3000 costs $62.50 for taxes?

157. How much must be the tax-rate in a city, if $2\frac{1}{2}\%$ of the valuation is to be raised, allowing 7% for losses and $2\frac{1}{2}\%$ for the expense of collecting?

DUTIES OR CUSTOMS.

158. WHAT is the duty on 250 hhd. of sugar, each weighing 495 lb.; tare 6% of the gross weight; duty 5 ct. per lb.?

159. What is the duty on 1500 bags of Java coffee, each containing 30 lb., tare 5%, at 12½ ct. per lb. in currency, gold being quoted at 105?

160. What is the duty on 36 casks of brandy, invoiced at $4.50 per gal.; there being 73 gal. in each cask; the duty $2 per gallon?

161. Paid 30% duty on an invoice of watches; what was the whole cost, if the duty was $1578.25?

162. The duty on some French cloth, at 25%, was $3000; what was the invoice price in francs, at $.193 per franc?

163. The invoice price of English silk was 12 s. 10 d. per yard; what was the number of yards, if the duty at 30% amounted to $2400?

164. If goods invoiced at $8000 pay a duty of $120, what is the rate?

165. If goods invoiced at $100 per ton cost $125 when delivered at the store, what is the rate of duty?

166. What is the duty on 1000 tons of steel rails, worth $80 per ton per invoice, at 25% ad valorem?

167. The duty on 3500 yd. of velvet, invoiced at $3 per yd., was $2520; what was the rate of duty?

168. Paid $320 duty on an importation of goods whose invoice value was $960; what was the rate of duty?

169. On goods invoiced at $10000 the duty was 15%; on others invoiced at $15000 the duty was 25%; the total cost of another invoice, including the duty of 30%, was $12090; what was the whole amount of the duties?

170. The entire cost, including freight $175 and a duty of 40%, is $10860; what is the amount of the duty?

171. The duty on an invoice of goods is 22%; the expenses are $200 freight and $20 storage; what is the duty, if the entire cost is $3500?

INSURANCE.

172. INSURED goods worth \$17800, at $1\frac{3}{4}\%$; what was the premium?

173. Insured my house for \$4000, at $2\frac{1}{4}\%$; my furniture for \$1000, at $\frac{7}{8}\%$; the policies costing \$1 each; what was the whole cost?

174. Insured a stock of goods, worth \$20000, for $\frac{3}{4}$ of their value, at $1\frac{1}{4}\%$; what do I lose in case the goods are lost?

175. Insured $\frac{5}{8}$ of a vessel at $4\frac{1}{2}\%$; the insurance company reinsured $\frac{5}{8}$ of their risk at $4\frac{1}{2}\%$; in case of the loss of the vessel, the first company will lose \$1289.25 less than the other; what was the value of the vessel?

176. The premium for insuring a vessel, at 5%, is \$1200; what is the amount insured?

177. The premium is \$120, and the amount insured is \$36000; what is the rate per cent.?

178. If I pay $4\frac{1}{2}\%$ a year on the value of a vessel, in what time will the entire value of the vessel be paid away in premiums?

179. A broker accepts a risk at 3%; he reinsures $\frac{1}{2}$ of it at 4%; his remainder of the premium was \$30; what was the amount insured?

180. If I insure $\frac{1}{2}$ of a vessel at $5\frac{1}{2}\%$, $\frac{1}{8}$ at $3\frac{7}{8}\%$, and the remainder at $4\frac{1}{4}\%$, what is the average rate?

181. The cost of insuring a house was \$228.50; this included \$1.50 for the policy, and \$2 for the survey; what was the rate, if the house is insured for \$18000?

182. A man insured his store at $2\frac{1}{4}\%$, the premiums to be paid annually. The store was destroyed after he had paid 10 premiums; what was the amount insured, if the net loss to the insurance company was \$5000?

183. If the premium is \$17.50, rate $3\frac{1}{8}\%$, what is the value insured?

184. What amount must be insured to cover the cost of a house worth \$10000, and the premium of $2\frac{1}{2}\%$?

INTEREST.

CASE I.

WHAT is the interest on the following sums at 6%?

185. $1350 for 2 years 9 months and 17 days.
186. $980 for 3 years 5 months and 10 days.
187. $3640 for 5 years 6 months and 12 days.
188. $1880.25 for 4 years and 7 months.
189. $169.165 for 9 months and 18 days.
190. $1000 for 7 years 7 months and 7 days.
191. $476 for 9 years and 23 days.
192. $1400 for 6 years 3 months and 9 days.
193. $1660.75 for 3 years 3 months and 3 days.
194. $80.90 for 4 years 8 months and 19 days.

Find the interest on the following sums at 5%:

195. $3000 for 1 year 1 month and 27 days.
196. $4500.50 for 3 years 8 months and 20 days.
197. $185.155 for 5 years 5 months and 25 days.
198. $300.25 for 7 years 8 months and 9 days.
199. $77.875 for 6 years 5 months and 4 days.
200. $10000.50 for 4 years 3 months and 22 days.
201. 333.33\frac{1}{3}$ for 3 years 7 months and 16 days.
202. $500 for 2 years 11 months and 5 days.
203. $175.75 for 1 year 9 months and 11 days.
204. $440.10 for 17 months and 24 days.

Find the interest on the following sums at 7%:

205. $130.60 for 325 days.
206. $290.93 for 193 days.
207. $666.66 for 2 years 3 months and 10 days.
208. $625.12 for 3 years 4 months and 17 days.
209. $7111.11 for 4 years 5 months and 6 days.
210. $250.14 for 2 years 8 months and 14 days.
211. $700.10 for 1 year 10 months and 12 days.
212. $2200 for 5 years 1 month and 8 days.
213. $180.50 for 2 years 7 months and 11 days.
214. $100 for 6 years 6 months and 18 days.

BUSINESS METHOD.

FIND the interest on each of the following sums at 6% :

215. $920 for 7 months and 27 days.
216. $850 for 11 months and 15 days.
217. $275 from Jan. 15, 1879, to Oct. 29, 1879.
218. $1325.75 from Feb. 28, 1878, to June 27, 1878.
219. $12790 from Mar. 1, 1878, to Jan. 30, 1879.
220. $362.50 from April 23, 1878, to Dec. 18, 1878.
221. $555.56 for 1 year 8 months and 3 days.
222. $1140.18 for 9 months and 19 days.
223. $476.48 for 10 months and 26 days.
224. $95.95 for 11 months and 11 days.

Find the interest on the following sums at 8% :

225. $2000 from July 10, 1878, to June 1, 1879.
226. $215.625 from May 19, 1878, to Dec. 24, 1879.
227. $185 for 7 months and 21 days.
228. $2320 for 5 months and 29 days.
229. $14000 for 8 months and 16 days.
230. $119.19 for 1 year 3 months and 9 days.
231. $246.25 for 17 months and 5 days.
232. $642.15 for 3 months and 15 days.
233. $462.51 for 1 month and 24 days.
234. $1500 from Aug. 21, 1878, to July 14, 1879.

Find the interest on the following sums at 9% :

235. $906 from Feb. 15, 1879, to Nov. 14, 1879.
236. $608.70 from March 8, 1878, to Oct. 1, 1878.
237. $102.25 for 8 months and 13 days.
238. $575.18 for 4 months and 14 days.
239. $750 for 5 months and 11 days.
240. $4000 for 9 months and 23 days.
241. $678.37 for 7 months and 17 days.
242. $892 for 11 months and 16 days.
243. $1808.88 for 4 months and 20 days.
244. $2680.16 for 3 months and 12 days.
245. $1252.10 for 9 months and 18 days.

CASE II.

246. What sum of money will amount to $5740 in 3 years at 7%?

247. What sum will produce $121 interest in 90 days at 5%?

248. What sum will produce $25.25 interest in 5 months at 6%?

249. What sum will produce $1000 a year at 7%?

250. What sum at 8% will produce 62½ cents in 20 days?

251. A house rents for $60 a month; the taxes and expenses are $108 a year, and the landlord has 6% clear profit on the money he paid for the house; what did he pay for the house?

252. What sum must be invested in property that pays 7½% profit to produce an income of $540 a year?

253. What principal will amount to $840 in 3 years 5 months and 10 days at 8%?

254. $280.80 is the annual interest of what sum at 9%?

255. A man loaned to a neighbor a sum of money at 4½% interest; at the end of 18 months the neighbor paid his debt, principal and interest, in all $1814.75. How much more than the sum borrowed did he return?

256. What sum will produce $832.25 interest from March 1, 1878, to July 11, 1878, at 4%?

257. The amount is $1000, rate 5½%, time 4 mo.; what is the principal?

258. What principal will amount to $3000 in 9 mo. and 9 days at 9%?

259. What sum will produce $1560 interest in 7 yr. 6 mo. at 9%?

260. What sum will amount to $16000 in 2 yr. 5 mo. 9 days at 6%?

261. If Brand puts his money at interest at 4%, it will amount to $20800 in 2 yr. 8 mo. 24 days; what interest will it yield in 7 yr. 6 mo. at 9%?

262. What sum invested at 5% interest will yield an annual income of $2500?

CASE III.

263. The interest is \$270, time 18 mo., principal \$3000; what is the rate?

264. \$150 interest on \$5000 for 3 mo. is at what rate per annum?

265. If a merchant pays \$3.73⅓ for the use of \$800 for 28 days, what is the rate per annum?

266. A house that costs \$6000 rents for \$36 a month; what per cent. does it pay on its cost, allowing \$57 annually for taxes and repairs?

267. At what rate per annum will \$60 gain \$18 in 3 yr. 4 mo.?

268. At what rate per annum will \$230 gain \$126.50 in 5 yr. 5 mo.?

269. At what rate per annum will \$10 earn \$30 in 10 years?

270. At what rate per annum will \$650 gain \$126.75 in 1 yr. 7 mo. 15 days?

271. At what rate per annum will \$120 gain \$32 in 5 yr. 4 mo.?

272. At what rate per annum will \$3030 gain \$1583.68 in 3 yr. 8 mo. 24 days?

273. At what rate per annum will \$288 gain \$10.08 in 1 year?

274. At what rate per annum will \$480 gain \$49.60 in 2 yr. 7 mo.?

275. If \$675 yields \$40.50 interest in a year, what is the rate %?

276. If \$800 amounts to \$848 in 180 days, what is the rate per annum?

277. If \$2800 on interest from Jan. 13, 1876, to Oct. 1, 1878, amounts to \$3142.30, what is the rate per annum?

278. If £26 18 s. 11¼ d. is the interest of £89 16 s. 5½ d. for 3 years 4 months, what is the rate per annum?

279. If \$26.40 is the interest of \$240 for 4 years, what is the rate per annum?

280. If \$750 is the interest of \$1500 for 6 years, what is the rate per annum?

CASE IV.

281. In what time will \$547.02 amount to \$625.73, at 3½%?

282. In what time will \$65, at 3%, gain \$9.18+ interest?

283. In what time will \$290 amount to \$348.74, at 6%?

284. In what time will \$240 gain \$13.03 interest, at 5%?

285. In what time will \$53 gain \$28.25 interest, at 6%?

286. In what time will \$2162.50 gain \$1667.84 interest, at 9%?

287. In what time will \$194.30 amount to \$229.18, at 6%?

288. The amount is \$70.59, the principal is \$66.88; what is the time, the rate being 6%?

289. The amount is \$782.472, the principal is \$380.905, the rate 6%; what is the time, allowing 365 days to the year?

290. In what time will \$880 gain \$160.76, at 3% interest?

291. The amount is \$2011, the interest \$11, the rate 12%; what is the time?

292. In what time will £50 gain £6 11 s. 3 d., at 5%?

293. In what time will \$160.20 gain \$5.606, at 2½%?

294. In what time will \$106.40 amount to \$109.16, at 9%?

295. In what time will \$785 gain \$41.67, at 7%?

296. In what time will \$2637.50 gain \$284.85, at 8%?

297. In what time will \$640 amount to \$1684.80, at 9%?

298. In what time will \$100 double itself, at 15%?

299. Jan. 1, 1878, I borrowed \$1200, at 6%; when will I owe \$1500?

300. In what time will \$325.41 amount to \$1522.88, at 10%?

301. In what time will \$3250 produce \$390 interest, at 12%?

302. The interest is \$218.62, the principal \$551.20; what is the time, if the rate is 6%?

303. In what time will \$217.18⅞ gain \$62.441, at 6%?

304. In what time will \$182.25 gain \$38.05, at 7%?

305. The interest is \$2.89, the principal is \$63.45, the rate is 7%; what is the time?

306. In what time will \$1008 gain \$2.10, at 2½%?

307. In what time will \$50.125 amount to \$202.482, at 8%?

308. In what time will \$21.10 gain \$.99, at 9%?

COMPOUND INTEREST.

309. WHAT is the compound interest of $360 for 5 yr., at 5%?

310. Find the compound interest of $180 for 3 yr. 5 mo., at 6%.

311. Find the interest of $400, at 4%, compounded for 6 yr.

312. Find the amount of $90, at compound interest, for 4 yr. 3 mo., at 5½%.

313. Find the compound interest of $600 for 7 yr. 5 mo. 10 da., at 4%.

314. Find the difference between the simple and the compound interest of $450 for 6 yr. 6 mo., at 8%.

315. What is the compound interest of $1600 for 8 yr., at 6%?

316. What principal, at 5% compound interest, will yield $17 in 6 years?

317. What principal will amount to $171.091 in 6 years, at 6%, compounded semi-annually?

318. What principal will amount to $179.2638 in 9 years, at 2% compound interest?

319. What principal will produce $126.53 interest in 6 years, at 4%, compounded annually?

320. What sum of money at compound interest will amount to $416.02 in 9 years and 6 months, at 3½%?

321. What sum of money at 10% compound interest will amount to $6026.54 in 3 yr. 2 mo. and 12 da.?

322. The amount at compound interest is $640, the rate 2½%, the time 10 years; what is the principal?

323. The compound interest is $8.1683, the time 7 years, the rate 3½%; what is the principal?

324. The interest for 5 yr. 6 mo., compounded semi-annually, is $39.0974; what is the principal, if the annual rate is 7%?

325. The compound interest on a certain sum for 8 years, at 8%, is $28.724; what is the principal?

PARTIAL PAYMENTS.

326. A NOTE of $1041, dated July 12, 1877, interest at 5%, was indorsed as follows: March 5, 1878, $36; July 20, 1878, $600; what was due June 9, 1879?

327. A note of $800, dated Feb. 5, 1876, interest at 4%, has the following indorsements: June 13, 1876, $28.37; Nov. 20, 1876, $12.50; March 20, 1877, $225; what was due June 21, 1877?

328. A note of $1000, dated June 1, 1875, interest at 7%, was indorsed as follows: August 2, 1875, $194.50; April 30, 1876, $29.50; June 28, 1876, $434; what was due December 1, 1877?

329. *Chicago, July 1, 1876.*

Three months after date we promise to pay F. C. Harrison & Co., or order, two thousand four hundred dollars, for value received, with interest at 6%. M. R. THOMPSON & BRO.

Indorsements: July 1, 1877, $2000; Jan. 1, 1878, $400; what was due at settlement, Jan. 31, 1879?

330. A note of $1800, dated Feb. 1, 1878, interest at 8%, has the following indorsements: June 2, 1878, $25; July 1, 1878, $500; Dec. 5, 1878, $40; Jan. 15, 1879, $275; what was due July 1, 1879?

331. A note of $3000, dated Jan. 1, 1876, and bearing interest at 5%, was indorsed as follows: May 1, 1876, $50; July 12, 1877, $50; Dec. 15, 1877, $120; June 1, 1878, $500; Sept. 30, 1878, $1000; Dec. 1, 1878, $200; what was due Nov. 1, 1879?

332. A note of $900, dated Feb. 28, 1877, interest at 6%, was indorsed as follows: July 12, 1877, $500; Aug. 30, 1878, $20; Feb. 28, 1879, $25; June 1, 1879, $12; what was due Jan. 1, 1880?

333. A note of $2700.75, dated April 14, 1875, interest at 8%, was indorsed as follows: May 1, 1876, $1005.75; April 1, 1877, $100; March 2, 1878, $1200; Jan. 1, 1879, $50; what was due Dec. 10, 1879?

334. A note of $4000, dated Jan. 1, 1878, and drawing interest at 7%, has the following indorsements: Feb. 15, 1878, $25; March 30, 1878, $25; July 30, 1878, $750; Oct. 1, 1878, $50; Dec. 1, 1878, $2000; June 9, 1879, $1200; what was due Oct. 29, 1879?

335. A note of $360, dated Mar. 8, 1872, interest at 6%, was indorsed as follows: Apr. 8, 1873, $27; May 8, 1874, $75; June 1, 1875, $100; July 10, 1876, $30; what was due Sept. 1, 1877?

336. A note of $1750, dated New York, Jan. 1, 1876, with legal interest, was indorsed as follows: April 15, 1876, $300; July 1, 1877, $75; Oct. 10, 1877, $25.30; Dec. 13, 1877, $325; Mar. 17, 1878, $1100; what was due Feb. 14, 1879?

337. $5000. *San Francisco, May 1, 1878.*

For value received, we jointly and severally promise to pay O. J. Smith, or order, five thousand dollars on demand, with interest at 10%. THOMAS CHILDS.
WILLIAM AMES.

Indorsements: June 9, 1878, $100; Aug. 1, 1878, $2000; Sept. 30, 1878, $50; Nov. 1, 1878, $75; Jan. 29, 1879, $1500; Mar. 21, 1879, $250; what was due June 30, 1879?

338. A note of $2900, dated Trenton, N. J., June 28, 1877, was indorsed as follows: Jan. 8, 1878, $900; Sept. 1, 1878, $1000; Dec. 21, 1878, $12; May 20, 1879, $500; what was due Sept. 1, 1879, interest at 7%?

339. $3000. *Philadelphia, June 15, 1876.*

Six months after date I promise to pay to the order of James N. Sanderson, three thousand dollars, with interest, without defalcation. Value received. F. P. WILLIAMSON.

Indorsements: Oct. 20, 1876, $200; Nov. 30, 1876, $350; Feb. 1, 1877, $800; July 10, 1877, $700; Aug. 30, 1877, $500; what was due Jan. 1, 1880?

340. A note of $400, dated Jan. 15, 1878, interest at 6%, was indorsed as follows: Feb. 1, 1878, $100; May 1, 1878, $50; June 1, 1879, $175; July 1, 1879, $40; what was due Jan. 1, 1880?

PRESENT WORTH AND DISCOUNT.

341. WHAT is the present worth of $160 due in 3 yr. 6 mo., at 7%?

342. Find the difference between the interest and the discount of $385, due in 2 years 5 months and 10 days, at 6%.

343. How much do I gain by borrowing money at 6%, to pay a debt of $10000, due in 1 yr., discounted at 7%?

344. What is the discount on $3640, due in 2 years 3 months and 20 days, at the rate of 8% per annum?

345. What is the present worth of $150.75, due in $5\frac{1}{2}$ years, at 5%?

346. If I receive 5% less than the face of a bill for $2200, due in 9 mo., what do I lose, money being worth 6% a year?

347. What is the discount on $1700, due in 18 months, at 4%?

348. What is the present worth of $25.75, due in $2\frac{1}{2}$ years, at 9%?

349. What is the present worth of $1660, due in 93 days, at 12%?

350. What is the discount on $197.98, due in 3 yr. 4 mo. 12 da., at 3%?

351. Which is the more profitable, $500 due in 18 months, at 9%, or $435 cash?

352. What is the present worth of $640.18, due in 9 mo., at $4\frac{1}{2}$%?

353. If I am allowed a discount of 6% from the face of a bill for $8000, due in 15 mo., do I gain or lose, and how much, by borrowing the proper amount to pay the bill, at 5% interest?

354. What is the discount on $2150.60, due in 60 days, at 7%?

355. What is the present worth of $1100, due in 7 mo., at $5\frac{1}{2}$%?

356. What is the discount on $378.80, due in 5 mo. 11 da., at 4%?

BANKING.

CASE I.

357. WHAT are the proceeds of a note of $600 for 90 days, discounted at 6%?

358. Find the proceeds of a note of $850 for 60 days, discounted at 7%.

359. Find the proceeds of a note of $900 for 30 days, discounted at 6%.

360. What is the discount on $1000 for 60 days, at 6½%?

361. What are the proceeds of a note of $1250 for 90 days, discounted at 7%?

362. Find the proceeds of $1600 for 60 days, at 8%.

363. Find the proceeds of $565 for 30 days, at 9%.

364. Find the proceeds of $600.58 for 60 days, at 6%.

365. Find the discount of a note of $12.75 for 90 days, at 8%.

366. Find the proceeds of a note of $312 for 60 days, discounted at 6%.

367. Find the proceeds of a note of $600, dated Jan. 11, at 90 days, discounted Feb. 6, at 6%.

368. What are the proceeds of a note of $750, dated Nov. 30, at 3 mo., discounted Jan. 26, at 6%?

369. What are the proceeds of a note of $365.50, dated Dec. 22, 1875, at 90 days, discounted Jan. 5, 1876, at 6%?

370. What are the proceeds of a note of $1600, dated Feb. 16, at 2 mo., discounted Mar. 23, at 7%?

371. Find the proceeds of a note of $1275.25, dated Jan. 31, 1876, at 3 mo., discounted Feb. 26, at 8%.

372. Find the proceeds of a note of $800, dated May 19, 1877, at 60 days, discounted June 30, at 9%.

373. Find the proceeds of a note for $1200 *with interest* at 6%, dated June 9, 1872, at 90 days, discounted July 3, at 7%.

NOTE.—In computing the *term of discount* when neither places nor dates are given, follow the general rule. When dates only are given, allow one more day than in examples under the general rule.

374. What are the proceeds of a note of $1365, dated May 11, at 60 days, discounted June 17, at 8%?

375. Find the proceeds of a note of $1000, dated Jan. 4, 1865, at 30 days, discounted Feb. 1, at 6%.

376. Find the proceeds of a note of $1214.50, dated Mar. 31, 1869, at 8 mo., discounted June 25, at 7%.

377. What are the proceeds of a note for $800 *with interest* at 8%, dated Apr. 3, at 60 days, discounted May 11, at 9%?

378. What are the proceeds of a note of $1150, dated Nov. 12, at 2 mo., discounted Dec. 13, at 6%?

379. What are the proceeds of a note of $860.75, dated Sept. 30, at 6 mo., discounted Oct. 25, at 7%?

380. Find the proceeds of a note for $1000 *with interest* at 6%, dated Oct. 19, at 90 days, discounted Nov. 25, at 6%.

381. Find the proceeds of a note of $650.25, dated Sept. 1, at 90 days, discounted Oct. 25, at 6%.

382. Find the proceeds of a note for $800 *with interest* at 7%, dated Oct. 31, at 4 mo., discounted Jan. 2, at 6%.

383. What are the proceeds of a note of $600, dated Jan. 7, at 60 days, discounted Feb. 3, at 7%?

384. What are the proceeds of a note of $450, dated May 31, at 5 mo., discounted July 6, at 8%?

385. What are the proceeds of a note of $575, dated Mar. 6, at 10 mo., discounted Nov. 15, at 6%?

386. Find the proceeds of a note for $950.25 *with interest* at 6%, dated Dec. 12, at 90 days, discounted Dec. 23, at 8%.

387. The proceeds of a 90-day note discounted at 6% are $46.50 less than the face of the note. What are the proceeds?

388. What are the proceeds of a note for $300 at 60 days, discounted at a Philadelphia bank?

389. What are the proceeds of a note for $300 at 60 days, discounted at a New York bank at 6%?

390. What is the difference between the true and the bank discount of $1872.25, for 93 days at 6%?

391. What are the proceeds of a note for $2700 at 6 months, discounted at 9%?

CASE II.

392. What is the face of a note at 60 days which when discounted at 6% will yield $500?

393. For what amount must a note at 6 mo. be drawn so that when discounted at 6% it will yield $750?

394. If the proceeds of a 30-day note discounted at 7% are $621.45, what is the face?

395. What is the face of a note at 3 mo. which when discounted at 8% will yield $587.60?

396. For what sum must a note at 30 days be drawn so that when discounted at 6% it will yield $994.50?

397. If the proceeds of a 60-day note discounted at 8% are $600, what is the face of the note?

398. What is the face of a note at 90 days which when discounted at 7% will yield $833.35?

399. For what sum must a note at 6 mo. be drawn so that it will yield $591 when discounted at 9%?

400. For what sum must a note at 90 days be drawn so that when discounted at 6% it will yield $725?

401. If the proceeds of a 30-day note discounted at 7% are $700, what is the face?

402. What is the face of a 60-day note that will yield me $569, when discounted at 8%?

403. If the proceeds of a 90-day note discounted at 6% are $846, what is the face?

404. What is the face of a 90-day note that will yield me $738.45 when discounted at 5%?

405. What is the face of a note at 5 mo. which when discounted at 7% will yield $976?

406. Find the face of a 30-day note which yielded $402 when discounted at 6%.

407. I bought goods to the amount of $650; for what sum should I draw a 60-day note so that when discounted at 7% it will yield that much cash?

408. For what sum must a 60-day note be drawn so that when discounted at 7% it will yield $850?

409. If the proceeds of a 30-day note discounted at 7% are $618, what is the face?

410. If the proceeds of a 90-day note discounted at 6% are $1192, what is the face?

411. What is the face of a note at 6 mo. which will yield $692 when discounted at 8%?

412. For what sum must a 30-day note be drawn so that when discounted at 6% it will yield $2150?

413. Jones bought a house for $2560, and gave his note at 60 days for such an amount that when discounted at 6% it should yield that sum; what was its face?

414. If I owe $600 cash to-day, for how much must I draw a note at 6 mo. so that when it is discounted at 9% the proceeds will pay the debt?

415. For what sum must a note at 90 days, *bearing interest* at 6%, be drawn, so that when discounted at 6% it will yield $800?

416. What is the face of a note at 60 days, dated May 7, if it yielded $472 when discounted June 11, at 6%?

417. What is the face of a 90-day note, dated Nov. 14, which yielded $825 when discounted Dec. 5, at 8%?

418. For what sum must I draw a 60-day note in order to get $100 proceeds if it is discounted at 6%?

419. If the proceeds of a 30-day note discounted at 7% were $623, what was the face?

420. If I buy goods for $500 cash, and sell them immediately for $570, receiving in payment a note due in 6 months, which I have discounted at 8%, what do I gain?

421. A note due in 2 yr. 6 mo., when discounted at 8%, yields $10000; what is the face of the note?

422. To pay a debt of $675.26, I have a 30-day note for $480 discounted at 6%, and raise the remainder on a 60-day note discounted at 6%. For what sum was the second note drawn?

423. A man has a 60-day note discounted at 6%, and receives $63.63 less than the face of the note. What does he receive?

INVESTMENTS.

CASE I.

424. If A invests \$2160 in 6% stock selling at 108, what income will it yield him?

425. What is my income from an 8% stock bought at 110, which cost me \$22000?

426. A 6% stock selling at 107½, brokerage ½%, cost me \$6480; what income will it yield me?

427. If I invest \$27145 in 5% stock selling at 89, what will my income be?

428. An academy invested \$25500 in 8% stock selling at 125; the income from the investment was given to the principal as his salary. What was his salary?

429. If I invest \$63600 in U. S. 5-20's selling at 106, what will my income be?

430. \$19000 invested in 5% stock selling at 95 will yield what income?

431. \$10800 invested in 8% stock selling at 120 will yield what income?

432. \$1100 invested in 4% stock selling at 54¾, brokerage ¼%, will yield what income?

433. \$10000 invested in 5% stock at par will yield what income?

434. I can invest \$19964 in 6% stock selling at 108½, or in 5% stock selling at 92; which will yield the greater income, and how much greater will it be?

435. A house renting for \$27 a month was sold by me for \$4000, and I invested the money in 6% stock selling at 80; is my income increased or diminished, and how much?

436. \$3500 invested in 6% stock yields me \$180 income; at what rate did I buy the stock?

437. If I sell \$2100 U. S. 5-20's at 108, and with the proceeds buy a 5% stock at 90, how much is my income increased?

438. What will be my income from \$2150 invested in a 6% stock selling at 107, brokerage ½%?

CASE II.

439. If I buy a 6% bond at 94, what is my rate of income?

440. What is my rate of income on a 5% stock bought at 85?

441. What rate of income do I get on a 10% stock bought at 140?

442. If I buy U. S. 5-20's at 115, what is my rate of income?

443. My house cost me $5000; if I rent it for $25 a month, and it costs me $25 a year for repairs and $50 for taxes, what rate of income does it yield me, and how much higher rate would my money yield if I had it invested in a 6% stock at 96?

444. What is the rate of my income from an 8% stock bought at 106?

445. What is the rate of my income from a 10% stock bought at 120?

446. If I buy a 5% bond at 107½, what is the rate of my income?

447. If I buy a 4% stock at 64, what is my rate of income?

448. What rate of income will a 6% stock bought at 109 yield?

449. What is the rate of my income from a 7% stock bought at 91?

450. If I exchange $11000 U. S. 5-20's at 108 for a 5% stock at 80, is the rate of my income increased or diminished, and how much?

451. What is my rate of income from a 6% stock bought at 102?

452. If I buy a 5% bond at 84, what is my rate of income?

453. If I buy a 10% stock at 110, what is my rate of income?

454. What rate of income will a 5% stock bought at 112 yield?

455. What is the rate of my income from a 7% stock bought at a discount of 2%?

CASE III.

456. What sum must I invest in a 6% stock that sells at 108, to secure an income of $4320 yearly?

457. To secure an income of $1500, what sum must I invest in a 5% stock that sells at 92, brokerage ¼%?

458. If I wish to have an annual income of $1250, how much must I invest in an 8% stock that sells at 116?

459. What sum invested in a 4% stock that sells at 60 will yield me an annual income of $600?

460. What sum must I invest in a 5% stock that sells at 103, to secure an annual income of $1355?

461. To secure an income of $500, what sum must be invested in U. S. 10-40's selling at 108?

462. If I desire an income of $1100, what sum must I invest in a 2% stock at 13?

463. To secure an income of $1620, what sum must be invested in a 4½% bond that sells at 102?

464. If I wish to have an annual income of $2700, what sum must I invest in a 10% stock at 122?

465. What sum must be invested in a 4% stock that sells at 71, to yield an income of $360?

466. If I wish to have an income of $2000, how much should I invest in a 6% stock selling at 105?

467. What sum must I invest in a 10% stock that sells at 104, to secure an income of $2050?

468. How much must I invest in a 7% stock that sells at 95, in order that the income from it will pay the annual interest on $8000 at 5%?

469. To secure an income of $702, what sum must be invested in a 3% stock that sells at 40?

470. What sum must I invest in a 9% stock that sells at 102, in order that the income from it may pay $115 a month for the rent of a farm?

471. What sum should I invest in an 8% stock that sells at 111, to secure the same income as that derived from $35000 invested in a 5% stock that sells at 70?

CASE IV.

472. At what price must I buy a 5% stock, that it may yield me an income of 6%?

473. If a 6% stock is yielding me an income of 4½%, at what price did I buy it?

474. What was the price of a 7% stock, if it is yielding me an income of 6⅛%?

475. What did I pay for a 2% stock, if it is yielding me an income of 18%?

476. At what rate must I buy a 7% stock, so that it will give me an income of 7⅝%?

477. At what rate was a U. S. 10-40 bond purchased, if it is yielding but 4½% on the investment?

478. If a 6% stock is yielding me an income of 8%, at what price was it purchased?

479. What must I pay for a 4% stock, so that it will yield me 6% income?

480. At what rate must I buy a 7% stock, so that it shall yield me 8½% income?

481. If I desire to secure 5% on my investment, at what rate must I buy a 4½% bond?

482. What did I pay for a 6% stock, if it is yielding me 5½% income?

483. My income from a 10% stock is 8½%; what did I pay for it?

484. My income from a 4½% bond is 6%; at what price did I buy it?

485. For how much must I buy a 12% stock, that it may yield me 8%?

486. How much did I pay for U. S. 10-40's, if they are yielding me 6¼%?

487. At what price did I purchase U. S. 5-20's, if they are yielding me an income of 5⅛%?

488. At what price did I purchase a 4½% stock, if it is yielding me but one-half as much income as a 7% stock purchased at 93?

GOLD INVESTMENTS.

CASE I.

489. How much currency is $115 in gold worth, when gold is quoted at 112?

490. How much currency is $1125 in gold worth, when gold is quoted at 110½?

491. What cost $375 in gold, when gold is at 27% premium?

492. What is the value in currency of $627 in gold, when gold is 28% above par?

493. How much currency will it take to pay the interest, at 6% in gold, on $800, gold being quoted at 108?

494. What is my income in currency from a ground-rent of $650, the interest of which is 6%, payable in gold, when gold is at 55% premium?

495. What is the value in currency of $1075 in gold, when gold is at 151?

496. What amount of currency will pay a debt of $370 in gold, when gold is quoted at 118?

CASE II.

497. How much gold, at 109, can I buy for $3330 in currency?

498. How much gold, at 105, equals $3300 in currency?

499. What amount of gold, at 114, is worth $1012 in currency?

500. What is the value, in gold, of $2500 in currency, when gold is at 128?

501. What is the value, in gold, of my income, if I own $5000 U. S. 6's, interest payable in currency, when gold is at 117?

502. How much gold, at 134, equals $1505 in currency?

503. How much gold, at 175, equals $500 in currency?

504. If I buy goods at $2700 and sell them for $3000 in currency, what is my gain in gold, if gold is quoted at 125?

505. How much gold can I buy for $18000 in currency, when gold is quoted at 216?

RATIO AND PROPORTION.

1. WHAT is the value of the ratio $.7 : \frac{6\frac{2}{3}}{5}$?

2. What is the ratio of a wine gallon to a bushel?

3. What is the inverse ratio of a pound Troy to 12 oz. Avoirdupois?

4. Find the difference between the inverse and direct ratio of 3 yd. 1 ft. 4 in. to 4 yd. 1 ft. 3 in.

5. What is the ratio of 9 guineas to $3.50?

6. What is the inverse ratio of 9° 10′ 10″ to 1° 40′ 15″?

7. The antecedent is $\frac{4}{5}$ and the ratio $\frac{10}{4}$; what is the consequent?

8. If the consequent is $1\frac{3}{8}$ and the ratio $1\frac{3}{8}$, what is the antecedent?

9. The ratio is 5, the consequent .22; what is the antecedent?

10. The ratio is 3.01, the antecedent $4\frac{3}{8}$ yd.; what is the consequent?

11. The inverse ratio is $\frac{2}{3}$, the consequent is $7.75; what is the antecedent?

12. If the antecedent is 5 mi. 150 rd. 10 in., and the ratio $\frac{1}{3}$, what is the consequent?

13. The antecedent is 18 pwt. 14 gr., the consequent is 2 oz. Avoirdupois; what is the ratio?

14. The ratio of the circumference of a circle to its diameter is 3.1416 nearly. If the antecedent of this ratio is 113, what is the consequent?

15. Find a simple ratio which shall be equivalent to the compound ratio $\left.\begin{matrix} 3:4\times4 \\ 3\times2:1\frac{1}{2} \end{matrix}\right\}$.

16. What is the antecedent, if the consequent is $\frac{6\times3}{2\frac{1}{4}+\frac{1}{8}}$, and the ratio is $\frac{1}{5}$?

17. What is the simple ratio equivalent to $8 \times 7 \times 6 : \frac{1}{4} \times .3\frac{1}{8} \times 6$?

18. The ratio of a foot to a meter is .3048; what is the ratio of 1 rod to a meter?

19. The ratio of a pint to a liter is .47325; what is the ratio of a liter to a gallon?

20. The ratio of a scruple to a gram is .1296; what is the ratio of a gram to a pound Troy?

21. The ratio of a franc to a dollar is .193; what is the ratio of $5.79 to 3 francs?

22. If a loaf of bread weighs 8 oz. when flour is $7.75 per barrel, what should it weigh when flour is $11.50 a barrel?

23. If the rent of a house, worth $3500, is $25 a month, what is the value at the same rate of a house that rents for $137.50 a month?

24. If my gain on $20000 worth of sales is $1250, what amount must I sell to gain $5060?

25. If $9\frac{3}{8}$ lb. of tea cost $5.80, what will $19\frac{1}{2}$ lb. cost?

26. If $3.80 will buy 72 lb. of soap, how many pounds can be bought for $19.75?

27. If $7\frac{1}{2}$ acres of grass will support 22 cows, how many acres will be required for 327 cows?

28. If 5 men can do a piece of work in 17 days, how many men will it require to do the work in $4\frac{1}{4}$ days?

29. If 7 gal. 3 qt. cost $15, what should 2 gal. 2 qt. cost?

30. If a man can walk 200 miles in 7 days of 9 hours each, how many days of 8 hours each would he require to walk the same distance?

31. If 6 men can mow a field in 10 hours, how many men must be added to mow it in 2 hours?

32. What is the rate per hour of a train that runs 16 mi. 30 rd. in 43 minutes?

33. If 3 cubic yards are equal to 2.2935 cubic meters, what is the value of 1 cubic foot 12 cubic inches?

34. If 2 rods equal 1.0058 dekameters, what is the value of 18 inches in dekameters?

35. If a merchant gains $1500 in 1 yr. 8 mo. 15 da., how much should he gain, at the same rate, in 5 years 9 months and 17 days?

36. If a boy can do $\frac{1}{3}$ of a piece of work in 6 days of 8 hours each, in what time could he do the remainder, working 4 hours and 15 minutes per day?

37. What must be paid for 200 lb. of sugar, if $12\frac{1}{4}$ pounds cost $62\frac{1}{2}$ cents?

38. If $25 gain $.15 in 90 days, how much will $75.10 gain in the same time, at the same rate?

39. If a railroad-train runs 356 mi. in 16 hr., how many hours will it require to run 1350 mi., at the same rate?

40. What is the value of 50 lb. 10 oz. of gold, if the weight of $5 is 5 pwt. 9 gr.?

41. If a cubic foot of water weighs $62\frac{1}{2}$ lb., what is the weight of 100 gallons?

42. If the interest of $500 for 18 months is $25.75, what is the interest of $97.15 for the same time, at the same rate?

43. If a man can do a piece of work in $5\frac{1}{2}$ days, working $9\frac{1}{2}$ hours a day, in what time could he do it working 8 hr. 35 min. a day?

44. If the interest on $75 for a year is $1.87\frac{1}{2}$, what sum will gain $11.87\frac{1}{2}$ in the same time?

45. If 1 acre 12 rods of land cost $215.75, what will 11 acres 9 rods cost?

46. If $\frac{7}{11}$ of a pound cost $\frac{1}{7}$ of a dollar, what will $11\frac{1}{7}$ lb. cost?

47. If $13\frac{1}{5}$ gallons of molasses cost $2.64, what will $5\frac{3}{4}$ gallons cost?

48. If $9\frac{1}{4}$ bushels of wheat cost $9\frac{3}{4}$ dollars, how many bushels can be purchased for $275.75?

49. If 10 barrels of apples cost 33.33\frac{1}{3}$, how many barrels can be bought for $50?

50. If a family consume $2\frac{1}{2}$ barrels of flour in 63 days, how much flour would keep them for 3 years of 365 days each?

51. If $\frac{2}{5}$ of an acre produces \$13.25 worth of fruit, how many acres would produce \$177.77 worth, at the same rate?

52. If a ship sails 72 miles in 8 hours 32 minutes, in what time would she sail 165 mi. 9 rd.?

53. If a gallon of wine costs \$3.165, what is the cost of 11 gal. 2 qt. $1\frac{1}{2}$ pt., at the same rate?

54. If $1\frac{1}{8}$ yd. of cloth cost \$4.12$\frac{1}{2}$, what will $8\frac{1}{4}$ yd. cost?

55. A, B, and C own a vessel, A owning $\frac{3}{8}$ of it, and B and C having equal shares in the remainder; A sells $\frac{4}{5}$ of what he owns for \$3680; what is C's share worth, at the same rate?

56. If the railroad fare of 5 men for a certain distance is \$9.60, what is the fare of 9 men and 7 children for the same distance, children half fare?

57. A can mow a field in $3\frac{1}{2}$ days, B in $4\frac{1}{3}$ days, and C in $5\frac{1}{4}$ days; in what time can they mow it, working together?

58. There are $211\frac{1}{2}$ gallons of water in a certain cistern, and by one pipe $23\frac{3}{8}$ gallons run out in one hour, while by another $52\frac{1}{4}$ gallons run in; in what time will the cistern be filled, its entire capacity being $8\frac{1}{3}$ hogsheads?

59. A and B can do a piece of work in $12\frac{3}{8}$ days, and A alone can do it in $28\frac{1}{2}$ days. In what time can B alone do it?

60. A, B, and C together own a farm; A and B together own $\frac{9}{18}$ of it, and B and C together own $\frac{5}{7}$ of it. If the whole value is \$18200, what is the value of B's share?

61. If 10 men and 7 boys can do a piece of work in $3\frac{4}{5}$ days, how many men can do it in $8\frac{1}{3}$ days, allowing the work of 9 boys to equal the work of 5 men?

62. M is $136\frac{1}{2}$ yards ahead of N, and N walks $5\frac{3}{4}$ yards while M walks $3\frac{5}{6}$ yards. How many yards must N walk to overtake M?

63. For 2 lb. of tea I can get 14 lb. of sugar or $4\frac{2}{3}$ lb. of coffee; what then is the value of $5\frac{1}{2}$ lb. of tea, 13 lb. of sugar, and 5 lb. of coffee, if 8 lb. of tea are worth \$5.60?

64. A can mow an acre in $7\frac{1}{3}$ hours, and A and B can mow $2\frac{2}{5}$ acres in $6\frac{3}{5}$ hours; in what time can B alone mow $2\frac{1}{11}$ acres?

65. A can do a piece of work in $8\frac{1}{4}$ days, and B in $7\frac{1}{3}$ days; they do the work together, and receive in payment \$11.22, which they divide between them, each being paid in proportion to his work. What does each receive?

66. $\frac{2}{7}$ of A's money $= \frac{5}{14}$ of B's; what is the ratio of B's to A's?

67. Find the unknown term in each of the following:

$5 \times 4 : 7 \times 8 :: 9 \times 10 :$ what? $\quad 3\frac{1}{2} \times 4\frac{1}{3} : 5\frac{1}{5} \times 6 ::$ what $: 8$?

$\left.\begin{matrix} 30 : 11 \\ 16 : 9 \end{matrix}\right\} ::$ what $: 4\frac{1}{2}$? $\quad$ What $: 16\frac{1}{9} :: \left\{\begin{matrix} 13\frac{1}{4} : 3 \\ 7\frac{1}{8} : 5\frac{1}{2} \end{matrix}\right.$?

$\left.\begin{matrix} 20 : 3 \\ 5 : 11 \end{matrix}\right\} :: 3\frac{1}{8} :$ what? $\quad \left.\begin{matrix} \frac{7}{8} : \text{what} \\ \frac{5}{8} : \frac{28}{81} \end{matrix}\right\} :: 5\frac{2}{5} : 1\frac{58}{75}$?

68. If 17 yd. of carpet, $\frac{3}{4}$ yd. wide, cost \$21.50, what will 111 yd., $\frac{7}{8}$ yd. wide, cost, at the same rate?

69. If \$30 is the interest of \$2000 for 3 mo., at 6%, what is the interest of \$168 for 16 mo., at $7\frac{1}{2}$%?

70. If \$800 gain \$96 in 18 mo., at 8%, what sum will gain \$28.50 in 6 mo., at 6%?

71. If \$550 gain \$41.25 in 1 yr. 3 mo., at 6%, in what time will \$320 gain \$72, at 9%?

72. If 264 bricks, each $8\frac{1}{2}$ in. long and $4\frac{1}{4}$ in. wide, will pave a given area, how many bricks, $8\frac{1}{4}$ in. long and 4 in. wide, will pave $3\frac{1}{2}$ times that area?

73. What is the cost of 8 pieces of paper, each $13\frac{1}{3}$ yards, at \$1.75 per piece of 11 yards?

74. 64 men engaged to do certain work in 30 days; at the end of 18 days, finding that $\frac{3}{4}$ of the work was done, the employer discharged a number of the men, the remainder being able to finish the work in the given time. How many men were discharged?

75. If 10 horses can eat $20\frac{1}{2}$ bundles of hay in $1\frac{1}{2}$ mo., how many horses will eat $127\frac{1}{10}$ bundles in $7\frac{3}{4}$ mo.?

76. If 15 apples cost 10 cents, when apples are \$1.50 a bushel, what should 25 apples cost, at $62\frac{1}{2}$ cents a bushel?

77. If \$5 gain 15 mills in 20 days, what will \$326.26 gain in 265 days, at the same rate?

78. One man and one boy agreed to mow $21\frac{3}{5}$ acres of grass in $6\frac{3}{4}$ days, working 12 hours a day; at the end of $4\frac{1}{2}$ days, only 12 acres having been mowed, another man, who works at the same rate as the first, is hired; the three, working $10\frac{2}{3}$ hours a day, finish the work in the given time; in how many days of 9 hours each could one man alone have done the work, and what is the ratio of the boy's work to the man's?

79. If 500 stones, each $7\frac{1}{2}$ in. long and 6 in. wide, are required for a pavement of a certain area, how many stones, $6\frac{1}{4}$ in. square, will lay a pavement of $\frac{4}{5}$ that area?

80. In the composition of water, the quantity of oxygen by weight is 8 times that of hydrogen; what is the weight of hydrogen in a wine gallon, which is to the imperial gallon as 5 to 6, the imperial gallon weighing 10 lb. Avoirdupois?

81. What will it cost to cover a floor 18 ft. square with carpet $\frac{3}{4}$ yd. wide, at $1.80 per yard?

82. If 26 yards of muslin cost as much as 3 yards of silk, and 13 yards of silk will pay for 4 pair of shoes, what is the price of the shoes per pair, $5\frac{3}{4}$ yd. of muslin being worth 69 cents?

83. A merchant buys herring at 2 s. 8 d. for 120, and sells them at 4 s. a hundred; how many hundred must he sell to gain £10?

84. If $1999.82 are paid for 18 A. 17 sq. rd. of land, what will be the cost of 231 A. 120 sq. rd., if the latter is worth 20% less per acre than the former?

85. If it costs $10.24 to carry 1500 lb. 356 miles, what will it cost to carry 2700 lb. 890 miles?

86. If 3 men or 5 boys can do a piece of work in $11\frac{1}{3}$ days of 12 hours each, in how many days of 10 hours each can 5 men and 3 boys do the work?

87. If $\frac{2}{5}$ of a ton of coal cost $3.16, how much will $1\frac{1}{2}$ tons cost, the latter being $\frac{1}{4}$ cheaper per ton than the former?

88. If 3 cords 10 cord feet of wood cost $27, what is the cost of 5 cords 5 cord feet 5 cu. ft., at 50% less per cord than the former?

89. If £17 11 s. 11 d. gain £1 9 s. 3 d. in 5 mo. 10 da., how much should £35 9 s. 3 d. gain in half the time, at $2\frac{1}{2}$ times the rate?

90. If I can read a book of 200 pages in 3 days, reading 4 hours a day, in how many days, at the same rate per hour, can I read a book of 800 pages, reading 2 hr. 20 min. a day, each page of the second book containing twice as much reading-matter as a page of the first?

91. If 14 men, in $3\frac{1}{2}$ days of 7 hours each, can do a piece of work, in how many days of 8 hours each can 11 men do the work?

92. If $121\frac{1}{4}$ yd. of silk, 2 yd. wide, cost \$2.50 a yard, what is the cost of $171\frac{1}{2}$ yd., $1\frac{1}{2}$ yd. wide, and 20% cheaper per yard than the first?

93. How many miles will a locomotive run in $10\frac{1}{32}$ hours, its wheels, $5\frac{2}{15}$ ft. in diameter, making 16 revolutions in 5 seconds, the diameter being to the circumference as 113 to 355?

94. If 8 men or 15 boys can plough a field in 15 days of $9\frac{1}{3}$ hours each, how many boys, at the same rate, must assist 16 men, if the work is to be done in 5 days of 10 hours each?

95. If 9 horses, or 18 sheep, or 12 cows, can eat $4\frac{1}{5}$ tons of hay in 32 days, how many horses, cows, and sheep, of each an equal number, will, feeding together, eat $1\frac{1}{5}$ tons in $9\frac{1}{7}$ days?

96. A's money is 20% less than B's; B's is $12\frac{1}{2}$% more than C's; and C's is $33\frac{1}{3}$% less than D's; if A has \$900, how much has D?

97. John has done 150 yards of certain work before James begins to do his share of the work; John can finish 20 yd. an hour, while James can finish 25 yd. and have 10 minutes' idle time in an hour; if John continues to work, and James does not idle at all, in how many hours will he have done as much work as John?

98. If $33\frac{1}{3}$% of a man's fortune, invested at 7%, makes \$750 in 8 mo. 10 da., in what time will $87\frac{1}{2}$% of his fortune, invested at 5%, make \$1080?

PARTNERSHIP, EQUATION OF PAYMENTS, AND AVERAGING OF ACCOUNTS.

1. THREE men, A, B, and C, employ $25000 in partnership. A's share of the gain is $1000; B's share is $500; C's share $800; what is the amount of each man's capital?

2. Two men lose $1600 in business; A's capital is $9000, and B's $4000; what is the loss of each?

3. A gain of $2250.30 is to be divided in the proportion of 1, 5, and 7; what is the value of each share?

4. A man bequeaths $6000, $7000, and $8000 to his three sons respectively, but the estate proves to be worth only $8000; what is the share of each?

5. Two men, with a capital of $7500, gain $1200; what is the capital of each, if one of them gains $250?

6. A, B, and C gain $4200; A's stock is $2100, B's stock is $3200, and C's gain is $750; what is the gain of each, and what stock has C?

7. A and B commence business with a capital of $13000; at the end of a year A is worth $8200 and B is worth $5200; what was the original stock of each?

8. Two merchants gain $3300 on a joint capital of $6000; what is the share of each, if one of them puts in $2800?

9. Four men, associated in business, gain $250, $175, $240, and $125 respectively; what is each man's share of $3000 capital?

10. A, B, and C lost 10% on a capital of $17000; A's share of the loss was $500; B's capital was $6000; what was the capital of each of the others?

11. Two men, trading together, with a capital of $4400, gain 15%; the gain of one is 50% less than that of the other; what is the capital of each?

12. A loss of \$3333$\frac{1}{3}$ is to be divided among 4 men in the proportion of 2, 4, 6, and 8; what is the loss of each?

13. A and B traded together, A investing \$800 for 7 mo., and B \$400 for 6 mo.; what share of \$640 gain has each?

14. Brown, Evans, and Walton formed a partnership; Brown invested \$2000 for 18 mo., Evans \$1500 for 1 year, and Walton \$300 for 9 mo.; they gained \$6237. What was each man's share of the gain?

15. Two men entered into partnership, with a joint capital of \$10000, and gained \$1750; what was the gain of the partner who invested \$2500 for a year, the remainder of the capital having been invested 16 mo.?

16. A and B formed a partnership, A investing \$3600, and B \$4800; how much more must A invest at the end of 10 mo., that he may be entitled to half the gain at the end of 18 mo.?

17. A invested \$16000; at the end of 5 mo. he withdrew \$9000; 2 mo. later he invested \$2000 additional; B, in partnership with A, at first invested \$11000, and at the end of 9 mo. put in \$4000 more. They gain \$6620 in 14 mo.; what is each man's share of the gain?

18. A, B, and C traded in company; in 9 mo. A gained \$200; B in 4 mo. gained \$180; and C, whose capital was \$300, in 3 mo. gained \$50; what was the capital of A and B respectively?

19. A and B traded together; in 11 mo. A's gain was \$2552, and B, who had invested \$8000, in 5 mo. gained \$1250; what was A's capital?

20. A and B entered into partnership for one year; A's capital during the first 6 mo. was $\frac{3}{5}$ of B's, and during the last 6 mo. was $\frac{3}{4}$ of B's; what share of \$6600 gain has each?

21. I owe \$250 in 5 mo., \$350 in 6 mo., and \$400 in 12 mo.; what is the equated time for the payment of the whole sum?

22. A man buys goods to the amount of \$3500; \$500 are to be paid down, \$2000 in 3 mo., \$900 in 1 mo., and \$100 in 1 year. If he prefers to make one payment of the whole, what is the equated time for doing so?

23. A, B, and C entered into partnership for one year, commencing Jan. 1, when A invested $1200; May 1, B invested $1500; and July 1, C invested such an amount that at the end of the year he was entitled to $280 gain, which was $\frac{7}{15}$ of the entire profits. How much did C invest?

24. $1000 invested in a speculation for 13 mo., $2000 for 5 mo., and $1300 for 10 mo., gained $846; what was the gain of each amount invested?

25. A and B traded together; A invested $200 for 4 mo., $500 for 6 mo., and $1000 for 2 mo.; B invested $2000 for 5 mo., and $1500 for 7 mo.; what was each partner's share of a loss of $700?

26. A, B, and C formed a partnership; A invested $800 for 9 months, B $600 for 13 months, and C $1200 for such a time that he is entitled to $720 profit out of an entire profit of $1320. What are A's and B's profits, respectively, and for what time was C's investment made?

27. April 15, I bought goods for $4000, $3000, and $2000, the first on 2 months' credit, the second on 3 months' credit, and the third on 4 months' credit. If I gave my note, April 15, for the whole amount, at what date was it made payable?

28. Bought, Mar. 1, a bill amounting to $500, on 4 months.

"	Mar. 20,	"	"	$360,	" "
"	April 9,	"	"	$550,	" "
"	May 11,	"	"	$330,	" "

At what date may the whole be paid without loss to buyer or seller?

29. July 5, I bought goods to the amount of $2400, $630 of which was to be paid down, $820 in 8 mo., and $950 in 9 mo.; what is the equated time for the payment of the whole?

30. If I loan Allen $2700 for $4\frac{1}{2}$ mo., without interest, and afterward borrow $500 from him, how long may I keep it to balance the account?

31. Bought Oct. 18, $840 worth of goods on 30 days, $360 worth on 90 days, and $960 on 60 days; what is the equated time for paying the whole in one sum?

*32. Bought, May 1, $540 worth of goods on 3 mo., $280 worth on 4 mo., $750 on 4 mo., and $320 on 7 mo. What term of credit should I have, if I agree to pay the whole in one sum?

33. If I owed $1900 cash, $1700 in 3 mo., $2500 in 6 mo., and $1400 in 9 mo., but agreed to make one payment of the whole at the equated time, what term of credit was allowed me?

34. If I owe $2200 in 18 mo., and pay $1000 of the debt in 4 mo., how long may I keep the remainder to balance the account?

35. Bought merchandise, Aug. 10, as follows: $3600 worth on 3 mo., $1500 on 4 mo., $2100 on 6 mo., and $1060 on 9 mo.; what is the equated time for making one payment of the whole?

36. A merchant owes $900, payable Sept. 9, $500 payable Oct. 11, and $800 payable Nov. 4. At what date may the whole debt in equity be paid?

37. Aug. 18, I buy goods amounting to $1800, $300 of which I agree to pay in cash, $500 on Sept. 23, $600 on Oct. 29, and the remainder on Nov. 25. The seller being in need of money, I increase the cash payment to $\frac{1}{2}$ of the whole debt; how long may I keep the balance, if I am to make one payment of it?

38. I borrowed $1360 for a year, but I paid $400 in 3 mo., and $900 in 11 mo.; how long after the expiration of the year may I keep the remainder?

39. Borrowed $360 for 10 mo., and $540 for 8 mo.; paid $600 in 7 mo.; how long after the equated time for the payment of the whole may the balance remain unpaid?

40. I owe $1750 in 60 days, and $700 in 30 days; if I pay $1400 in 20 days, how long after the equated time for the payment of the whole may I keep the balance?

41. A merchant owes $630 due in 60 days, and $700 due in 30 days; he pays $480 in 20 days, and $500 in 30 days; when is the balance due?

42. A owes \$4800, $\frac{1}{3}$ of which is payable on the first of March, $\frac{1}{6}$ on the first of September, and the remainder on the first of November. If he should pay $\frac{2}{3}$ cash on the first of May, how long should he keep the balance?

43. If I pay $\frac{1}{4}$ of a debt 3 months before it is due, and $\frac{1}{6}$ of it 2 mo. before it is due, how long after it is due may I keep the balance?

44. If I pay to Atwood & Co. a debt of \$90, 63 days before it is due, and a debt of \$100, 33 days before it is due, how long after it is due may I withhold \$150, owed to the same firm?

45. A buys a house, Jan. 1, 1879, for \$7500, on the following terms: \$2500 is to be paid cash, and of the remainder \$1000 is to be paid April 1, and an equal sum (\$1000) every quarter thereafter until the whole debt is discharged. If A had preferred to give a note for the whole amount, when would it have become due?

Find the equated time of payment of the following bills, made in 1879;

46. Feb. 4, \$220, at 30 days, Mar. 4, \$500, at 60 days, May 1, \$830, at 90 days, and June 17, \$280, at 120 days.

47. Jan. 10, \$190, at 30 days, Mar. 15, \$94, at 30 days, Sept. 30, \$146, at 60 days, and Oct. 1, \$80, at 90 days.

48. Nov. 3, \$325, at 60 days, Nov. 15, \$418, at 60 days, Dec. 20, \$460, at 30 days, and Dec. 22, \$620, at 120 days.

49. June 7, \$1150, at 30 days, June 14, \$1340, at 3 mo., June 21, \$1500, at 4 mo., and July 19, \$1550, at 90 days.

50. Apr. 21, \$666, at $2\frac{1}{2}$ mo., Apr. 25, \$975, at 3 mo., May 2, \$1020, at $3\frac{1}{2}$ mo., June 30, \$1860.40, at 4 mo.

51. Apr. 2, \$56.60, at 30 days, May 2, \$162.18, at 30 days, May 15, \$275, at 60 days, and June 4, \$18.27, at 60 days.

52. May 1, \$100, at 1 mo., May 5, \$180.15, at 60 days, May 19, \$330.80, at 3 mo., June 12, \$119.75, at 50 days.

53. Mar. 8, \$2400, at 60 days, Mar. 15, \$218, at 60 days, July 5, \$3200, at 90 days, July 12, \$580, at 90 days.

54. Aug. 1, \$770, at 30 days, Aug. 30, \$823, at 60 days, Sept. 20, \$919, at 60 days, Sept. 30, \$150, at 30 days.

55. Dec. 3, $18.30, at 10 days, Dec. 10, $60.90, at 20 days, Dec. 15, $125, at 30 days, Dec. 31, $40.60, at 90 days.

56. Nov. 10, $176.75, at 3 mo., Nov. 13, $287.50, at 4 mo., Nov. 22, $444, at 4 mo., Nov. 27, $500, at 5 mo.

57. July 17, $18240, at 1 mo., July 21, $22210, at 2 mo., Aug. 4, $3400, at 2 mo., Aug. 18, $5600, at 3 mo.

58. May 1, $256, at 3 mo., June 4, $1100, at 3 mo., Aug. 1, $1000, at 3 mo., Sept. 1, $800, at 3 mo.

59. June 10, $106.18, at 30 days, June 17, $205.50, at 30 days, June 24, $50, at 60 days, July 1, $62.50, at 60 days.

60. Sept. 1, $75, at 3 mo., Sept. 8, $90, at 2 mo., Sept. 15, $110, at 3 mo., Sept. 22, $15, at 2 mo., Sept. 29, $600, at 1 mo., Oct. 6, $280, at 1 mo.

61. Oct. 1, $100, at 2 mo., Nov. 1, $150, at 2 mo., Nov. 20, $200, at 30 days, Dec. 1, $400, at 15 days, Dec. 10, $80, at 20 days, Dec. 15, $75, at 10 days, Dec. 22, $110, at 30 days.

In the following accounts for the year 1879, find when the balance is due, also what the cash balance is for each on Jan. 1, 1880, interest at 6%.

62. Dr. Jan. 10, To Mdse., at 30 da., $290; Jan. 30, $475, at 60 da.; Feb. 7, $810, at 60 da.; Mar. 4, $136, at 90 da.

Cr. Feb. 14, By Cash, $100; Feb. 28, Draft at 30 da., $1000; Mar. 1, Cash, $150.

63. Dr. Mar. 1, To Mdse., at 3 mo., $500; Mar. 14, $380, at 3 mo.; Apr. 2, $1300, at 3 mo.; Apr. 9, $230, at 3 mo.

Cr. May 8, By Cash, $950; June 10, $600; July 1, $580.

64. Dr. Apr. 9, To Mdse., at 30 da., $1700; July 3, $2200, at 60 da.; July 10, $1200, at 30 da.

Cr. May 1, By Mdse., at 60 da., $1900; July 5, Cash, $1900; Aug. 5, Mdse., at 4 mo., $1400.

65. Dr. June 2, To Mdse., at 30 da., $190; July 7, $500, at 60 da.; July 18, $826, at 90 da.

Cr. July 12, By Note, at 30 da., $690; Aug. 1, Cash, $700.

66. Dr. Aug. 15, To Mdse., at 3 mo., $2600; Sept. 18, $1600, at 4 mo.; Oct. 10, $2000, at 2 mo.; Oct. 25, $1400, at 1 mo.

Cr. Oct. 23, By Cash, $2400; Nov. 7, Draft, at 30 da., $2200; Dec. 11, Mdse., at 3 mo., $1850.

67. Dr. Jan. 31, To Mdse., at 60 da., $1150.75; Mar. 28, $620, at 60 da.; Sept. 16, $2800.75, at 60 da.

Cr. Apr. 29, By Mdse., at 4 mo., $3000; July 22, Cash, $550; Dec. 3, Note, at 30 da., $1000.

68. Dr. May 7, To Mdse., at 30 da., $925.50; Aug. 28, $750.25, at 30 da.; Sept. 30, $1318.90, at 60 da.; Nov. 3, $800, at 90 da.; Dec. 1, $550, at 30 da.

Cr. June 19, By Cash, $700; Oct. 10, Note, at 90 da., $1500; Nov. 4, Cash, $1000; Nov. 29, Cash, $650.

69. Dr. Jan 24, To Mdse., at 90 da., $330; July 17, $685, at 90 da.; Sept. 24, $900, at 60 da.; Dec. 1, $196.50, at 30 days.

Cr. Oct. 8, By Mdse., at 2 mo., $1160; Sept. 2, Cash, $150; Nov. 18, Note, at 30 da., $600.

70. Dr. Jan. 3, To Mdse., at 60 da., $100; Jan. 10, $250, at 30 da.; Jan. 14, $120, at 60 da.; Jan. 17, $300, at 30 da.; Jan. 24, $500, at 90 da.; Jan. 31, $800, at 60 da.

Cr. Mar. 3, By Note, at 3 mo., $500; Mar. 24, Cash, $250; Mar. 31, Note, at 30 da., $300; Apr. 7, Mdse., at 60 da., $100; Apr. 14, Cash, $500.

71. Dr. Feb. 3, To Mdse., at 6 mo., $920.50; Feb. 10, Draft at 60 da., $850; Feb. 17, Mdse., at 4 mo., $400.90; Feb. 24, $1800, at 30 da.; Mar. 3, $128.01, at 90 da.

Cr. July 7, By Cash, $550.80; July 14, Note, at 90 da., $200; July 21, Cash, $300; July 28, $500.25; Aug. 4, $112.75; Aug. 11, Draft, at sight, $400.

ANALYSIS.

1. I SOLD a quantity of goods at 20% gain; if the cost had been $15 less, the same selling price would have been to me 50% gain. What was the cost?

2. Divide $2200 into two such parts that the amount of the first at 5% for 7 yr. shall be equal to the amount of the second for 8 yr. at 5%.

3. At a certain rate of sale, my gain is 20%; if the cost had been 5% less, what would be my gain, the selling price remaining the same?

4. $\frac{4}{5}$ of a certain number minus $\frac{2}{5}$ of the difference between the number and its $\frac{4}{5}$ is $16\frac{1}{3}$; what is the number?

5. If I sell goods $125 above cost, I gain 10%; what will be my gain per cent. if I sell them $175 above cost?

6. The greater of two numbers is $3\frac{1}{4}$ times the less, and their sum is 16; what are the numbers?

7. I bought 10 barrels of apples; $\frac{1}{4}$ of them proving worthless, I sell the remainder at $3.96 per barrel, and thus gain 10% on the whole cost; what was the cost per barrel?

8. If 6 men can do a piece of work in $5\frac{3}{4}$ days, how many men will be required to do 3 times as much work in $11\frac{1}{2}$ days?

9. A, B, and C formed a partnership; A put into the business $\frac{1}{5}$ of the capital, B $\frac{2}{3}$, and C the remainder. How should a loss of $2700 be apportioned among them?

10. If the amount is $340, the time 5 yr., and the rate 6%, what is the principal?

11. A and B invest equal sums of money; A gains 20%, and B loses $20; B's money is then equal to $\frac{4}{5}$ of A's: how much did each invest?

12. A's money is to B's as 9 to 14, but if each should lose $18, A's would be to B's as 3 to 5. How much has each?

13. John's money is to Henry's as 3 to 7; if Henry should give John $20, John's money would then be to Henry's as 2 to 3. How much money has each?

14. I bought 150 gallons of vinegar at 30 cents per gallon; $\frac{1}{3}$ of it I sell at 42 cents per gallon, and, adding water to the remainder, sell the mixture at 35 cents a gallon. In the sale of the whole I clear $33\frac{1}{3}\%$ on the whole cost. How many gallons of water did I add?

15. If 11 bushels of corn are worth $\$4.12\frac{1}{2}$, what is the value of 36 bu. 2 pk. 1 qt., at the same rate?

16. If $9\frac{1}{2}$ acres of land produce $256\frac{1}{2}$ bu. of wheat, how many acres will it require to produce 1500 bu.?

17. If $13\frac{1}{4}$ yd. of cloth are worth $39.75, how many yards can be purchased for $279.25?

18. If 1 gal. 3 qt. 1 pt. of wine cost $2.60, what is the value of 63 gal. 2 qt.?

19. If $15\frac{1}{2}$ yards of cloth cost $38, what is the cost of 9 pieces of cloth, each containing $39\frac{1}{2}$ yd.?

20. If 6 men or 9 boys can do a piece of work in $11\frac{1}{2}$ days, in what time will 2 men and 4 boys do the work?

21. A man can mow a field in 3 days if he works 4 hr. 30 min. per day; in what time could he mow 4 such fields, working 6 hr. 25 min. per day?

22. A merchant who owns $\frac{8}{16}$ of a vessel sells $\frac{3}{8}$ of his share for cost, and the remainder for $3960, clearing by both sales 20% on the whole cost of his share; what is the value of the vessel at the rate the merchant paid for his share?

23. If $\frac{3}{5}$ of $\frac{3}{4}$ of the value of a farm is $10000, what is the whole value?

24. If 3 men can earn $37.60 in $\frac{5}{6}$ of a month, how much could they earn in $3\frac{1}{5}$ months?

25. If the interest of $15 for 6 mo. is $2.19, what is the interest of $17.20 for $4\frac{1}{2}$ months?

26. If $1\frac{1}{2}$ barrels of flour last a family of 5 persons for $6\frac{1}{7}$ weeks, how many barrels will be required to last 9 persons $17\frac{1}{7}$ weeks?

27. If \$13.50 will amount to \$26 in 1 yr. 3 mo., what will \$10 amount to in $5\frac{1}{2}$ months?

28. If $6\frac{1}{4}$ oz. of silver are worth \$6.10, what is the value of $9\frac{1}{2}$ pwt.?

29. If 5 A. 9 sq. rd. are worth \$960, what are 8 A. 121 sq. rd. worth?

30. What is the cost of $100\frac{2}{5}$ yd. of cloth, if $125\frac{1}{2}$ yd. cost \$263.75?

31. If 9 bu. 1 pk. 2 qt. of wheat are equal in value to 17 bu. 3 pk. 1 qt. of corn, how many bushels of corn are equal in value to 100 bu. of wheat?

32. A can do a piece of work in $1\frac{1}{2}$ days, B in 2 days, and C in $2\frac{1}{4}$ days. They work at it together, until A and B are obliged to leave; then C does the remaining work in $\frac{1}{5}$ of a day; in how many days was the whole work done?

33. Divide \$100 into three parts in the ratio of $\frac{1}{4}$, $\frac{2}{5}$, and $3\frac{1}{2}$.

34. If 10 bushels of rye are equal in value to $8\frac{1}{2}$ bushels of barley, and 3 bu. of barley are equal to $1\frac{1}{4}$ bu. of wheat, how many bushels of rye are equal in value to 19 bu. of wheat?

35. A trader bought cows, sheep, and horses, 70 in all; there were three times as many horses as cows, and twice as many sheep as horses; how many were there of each?

36. $\frac{2}{3}$ of my money is \$200 less than $\frac{5}{7}$ of it; how much have I?

37. A's age is $\frac{1}{2}$ of B's, and C's age equals twice the sum of A's and B's ages; what is the age of each, the sum of their ages being 63 yrs.?

38. If a watch that loses 3 min. in 24 hours is set right at 10 A. M. on one day, what will be the correct time when the watch marks 12 o'clock noon the next day?

39. If two men own respectively $\frac{1}{5}$ and $\frac{1}{6}$ of a ship, how should a loss of \$1100 on their shares be divided between them?

40. If I sell $\frac{3}{5}$ of my goods at $16\frac{2}{3}\%$ gain, at what rate of loss must I sell the remainder that I may neither lose nor gain on the whole?

INVOLUTION AND EVOLUTION.

1. WHAT is the second power of 17? The third power?

2. What is the third power of 9? The fourth power?

3. What is the fourth power of 12? The fifth power?

4. What is the fifth power of 21? The sixth power?

5. What is the value of $7^2 \times 53^3$? Of $9^2 \times 10^4$?

6. What is the value of $5^3 + 6^2$? Of $4^4 \times 8^2$?

7. What is the value of 375^2? Of $11^2 \times 2^4$?

8. What is the value of $11.5 + 3^3$? Of $2.7 + .02^4$?

9. What is the square of $19\frac{1}{2}$? The square of .006?

10. What is the cube of 2.2? The cube of 25?

11. Raise $\frac{7}{8}$ to the third power. $\frac{3}{4}$ to the fifth power.

12. What is the second power of $\frac{1}{2}$ of $\frac{2}{3}$? Of $\frac{7}{8}$ of $\frac{8}{7}$?

13. What is the third power of $\frac{1\frac{1}{4}}{2.5}$? The fourth power?

14. What is the cube of 4^2? The fourth power of 2^3?

15. What is the sixth power of 11? The seventh power?

16. What is the square of $.2^3$? The third power?

17. What is the third power of $(.1 \times 2^2)$? The fourth power?

18. What is the fourth power of 6.1? The fifth power?

19. Involve .37 to the second power. The third power?

20. Involve 1.3 to the fourth power. The fifth power?

21. What is the cube of 5.5? The fourth power of 9^2?

22. What is the square of .002? The third power?

23. What is the fifth power of $\frac{1}{2}$? The sixth power?

24. Involve $\frac{1}{8}$ to the fourth power.

25. What is the value of $3^3 \times 3^3 \times 3^2$? Of $2^2 \times 2^3 \times 2^5$?

26. What power of 175 is $175^5 \times 175^{15}$? Of 6 is $6^{11} \times 6^{17}$?

27. Raise 99 to the third power by multiplying its tens and units separately.

28. $17^{10} \div 17^5 =$ what power of 17?

29. What is the square root of 9345249? Of 83.92?
30. What is the square root of 17147881? Of 10?
31. What is the square root of 8390? Of 102.06?
32. What is the square root of 260? Of 1714788.1?
33. What is the square root of 97.199881? Of 27^4?
34. What is the square root of 93470224? Of 7.85?
35. What is the square root of 893? Of 99980001?
36. What is the square root of $123\frac{87}{81}$? Of 5683?
37. What is the square root of 3^6? Of .0893?
38. What is the square root of $\frac{289}{4}$? Of 500?
39. What is the square root of 21.16? Of 7?
40. What is the square root of 81.018001? Of $\frac{3}{4}$?
41. What is the square root of .4? Of 43046721?
42. What is the square root of 7500? Of $2\frac{21}{45}$?
43. What is the square root of .001? Of 9.009?
44. What is the square root of 3.877? Of 1256?
45. What is the square root of 38.77? Of 700.5?
46. What is the square root of 90? Of 9981?
47. What is the cube root of 1771561? Of .493089?
48. What is the cube root of 778688000? Of $\frac{6591}{14789}$?
49. What is the cube root of .00015625? Of 704969?
50. What is the cube root of 29791? Of 64192192064?
51. What is the cube root of 373248000? Of 27818127?
52. What is the cube root of 970299? Of 77308776?
53. What is the cube root of 10941048? Of .000010?
54. What is the cube root of $\frac{625}{2560}$? Of 34518.6012116?
55. What is the cube root of 50 to 5 decimal places?
56. What is the cube root of $\frac{1250}{80}$? Of 1345029?
57. What is the cube root of $\frac{1458}{16}$? Of 270000?
58. What is the cube root of .00105? Of $46 \div 3\frac{1}{15}$?
59. What is the cube root of $.37\frac{1}{27}$? Of .000011?
60. What is the cube root of 470? Of 47000?
61. What is the cube root of 4700? Of 28000?
62. What is the cube root of 28652616? Of 24000?
63. What is the cube root of 344324701729? Of 2429.99?
64. What is the cube root of 100000? Of 148.877?

GRADED PROBLEMS IN MENSURATION.

SURFACES.

FIND the area of each of the triangles having the following dimensions:

1. Altitude 16 feet, base 36 feet.

2. Altitude 16 yards 2 feet, base 11 yards 1 foot.

3. Base 14 yards 2 feet 6 inches, altitude 21 yards 2 feet.

4. Altitude 28 chains 30 links, base 24 chains 48 links.

Find the areas when the sides are as follows:

5. 170 yards, 170 yards, and 308 yards.

6. 210 feet, 232 feet, and 286 feet.

7. 1066 chains, 1750 chains, and 1776 chains.

8. 746 poles, 746 poles, and 1008 poles.

9. 222 inches, 29 feet 2 inches, and 29 feet 4 inches.

Find the hypotenuse from the given base and perpendicular in each of the following right-angled triangles:

10. 266 feet, and 82 feet 6 inches.

11. 3792 yards, and 1968 yards 1 foot 6 inches.

12. 139 feet 4 inches, and 131 feet 3 inches.

13. 440 yards, and 172 yards 2 feet.

14. 4395 feet, and 1291 yards 1 foot.

Find the remaining side of the right-angled triangle when the hypotenuse and one side are given:

15. Hypotenuse 362 yards 1 foot, side 322 feet.

16. Hypotenuse 538 feet 10 inches, side 501 feet 4 inches.

17. Hypotenuse 680 yards 2 feet, side $\frac{1}{4}$ mile.

18. Hypotenuse 1294 yards, side 862 yards.

19. Hypotenuse 848 feet 6 inches, side 553 feet.

20. Find to six decimal places the diagonal of a square whose side is one foot.

21. The side of a square is 11 feet; find the diagonal.

Find the area in square yards, feet, and inches of rectangles having the following dimensions:

22. 12 feet 6 inches wide by 21 feet 6 inches in length.

23. 24 yards 3 inches by 27 feet 6 inches.

24. 5 yards 2 feet by 18 feet 10 inches.

25. 10 yards 2 feet 2 inches by 12 yards.

26. 4 yards 2 feet 8 inches by 4 yards 2 feet.

27. 6 yards 6 inches by $3\frac{1}{2}$ feet.

Find the area, in acres and poles, of rectangles having the following dimensions:

28. 10 chains 28 links by 12 chains 50 links.

29. 18 chains 48 links by 20 chains 72 links.

30. 14 chains 8 links by 16 chains 24 links.

31. 12 chains 20 links by 12 chains.

32. What is the area of a rhombus, the base being 15 chains and the altitude 9 chains?

33. The base of a rhombus is 15 rods 3 yards, and the altitude 3 chains 7 feet; what is the area?

34. The base of a rhomboid is 220 yards, and the altitude 5 poles 10 inches; what is the area?

Find the altitude of the following parallelograms, having given the area and base:

35. Area of a rhombus one acre, base 100 yards.

36. Area of a rectangle a square mile, base 5 chains.

37. Area of a rhomboid 1000 acres, base 3 miles.

38. Area of a square 5 acres; what is the side?

39. If a street 5 miles long contains $30\frac{10}{33}$ acres, what is its width?

40. The diagonal of a rectangle is 458 feet, and one side is 442 feet; what is the area?

41. How many bricks 9 inches long and $4\frac{1}{2}$ inches wide will be required to pave a space 18 feet long by $12\frac{3}{4}$ feet wide?

Find the areas of trapezoids having the following dimensions:

42. Parallel sides 6 feet and 12 feet, altitude 18 inches.

43. Parallel sides 3 yards and 5 yards, altitude 4 feet.

44. Parallel sides 50 links and 25 links, altitude 12 links.

45. The sum of the parallel sides of a trapezoid is 5 chains. and the altitude is 3 rods; what is the area?

46. The area of a trapezoid is $2\frac{1}{2}$ acres, the sum of the parallel sides 10 chains; what is the altitude?

47. The area of a trapezoid is 16 acres 97 rods, and the sum of the parallel sides is 450 yards; what is the altitude?

48. In a trapezium the diagonal is 28 rods, and the altitudes of the triangles into which the trapezium is divided are 60 feet and 37 feet respectively; what is the area?

49. The sides of a quadrilateral taken in order are 10, 10, 8, and 6 rods, and the diagonal which cuts off the first two sides is 12 rods; what is the area of the quadrilateral?

50. The diagonals of a rhombus are 84 feet and 30 feet; what is the area?

51. The diagonal of a square is 100 feet; what is the area?

Find the circumferences of circles whose diameters are as follows:

52. .31631 yards. 7.9577 feet. 103.4505 feet.

53. 70.028 yards. 28 inches. 5 chains 75 links.

54. The circumference of a circle is 10 yards; what is the diameter?

55. The circumference of a circle is 216 yards; what is the radius?

56. The circumference of a wheel is 25 feet; what is the diameter?

Find the diameters of circles with the following circumferences:

57. 252 feet 6 inches. 10 chains 80 links.

58. 1700 yards 2 feet. 396 feet 9 inches.

59. 157 poles. 1 mile 20 yards.

60. 360 chains 10 rods. 8 yards 1 foot 6 inches.

Find the areas of circles whose dimensions are as follows:

61. Radius 100 feet. Diameter 50 yards.

62. Diameter 1 mile. Radius 1 chain.

63. Circumference $5\frac{1}{2}$ chains. Circumference $2\frac{1}{4}$ miles.

64. Circumference 150 yards 2 feet 10 inches.

65. Radius 14 inches. Circumference 17 yards.

66. The area of a circle is 1 acre; what is the radius? What is the circumference?

67. The area of a circle is half a square mile; what is the diameter? What is the circumference?

68. The radius of one of two concentric circles is 20 feet, and of the other circle, 30 feet; what is the area of the ring between the two circles?

69. At a pressure of 120 pounds to the square inch, what is the total pressure on a circular valve whose radius is $1\frac{5}{8}$ inches?

70. The area of a circle is 10 square feet; what is the circumference?

71. The diameter of a circle is 18 yards; what is the side of the inscribed square?

72. Find the side of the inscribed square when the area of the circle is 1 acre.

73. The circumference of a circle is 1 yard; what is the side of the inscribed square?

74. The radius of a circle is 1000 yards; what is the diagonal of the inscribed square?

75. The sides of a right-angled triangle are 27 and 43 feet respectively; what is the area of the circle described on the hypotenuse as diameter?

76. The area of a square inscribed in a circle is a square yard; what is the diameter of the circle?

77. A square whose side is 12 feet is inscribed in a circle; what is the area of the circle?

78. The sides of a triangle are 3, 4, and 5 feet; what is the area of a circle which has the same perimeter?

79. A circle is 10 feet in circumference; find the area of a square inscribed in it.

SOLIDS.

FIND the convex surface of rectangular prisms having the following dimensions:

80. Length 6 feet, width 6 feet, height 6 feet.

81. Length 12 ft. 6 in., width 4 ft. 6 in., height 3 ft. 3 in.

82. Length 7 ft. 4 in., width 9 ft. 5 in., height 11 ft. 2 in.

83. Length 12 chains, width 25 rods, height 130 yards.

84. What is the convex surface of a cylinder whose height is 17 ft. and the diameter of whose base is 20 ft. 6 in.?

85. The radius of the base of a cylinder is 1 chain, and the height of the cylinder is 92 links; what is the convex surface?

86. If the height of a cylinder is 200 yards, and the radius of its base is $1\frac{1}{8}$ chains, what is its convex surface?

87. What is the convex surface of a cylinder whose height is 128 yards and the radius of whose base is 9 yd. 11 in.?

88. The length, breadth, and height of a prism are each 9 feet; what is its whole surface?

89. What is the whole surface of a triangular prism whose height is 19 feet, each side of its base being equal to the height?

90. One side of the base of a hexagonal prism is 6 ft., and the height of the prism is 10 in.; what is the whole surface of the prism?

91. The radius of the base of a cylinder is 1 yd., and the height of the cylinder is 6 ft.; what is its whole surface?

92. The height of a cylinder is 4 ft. 3 in., and the diameter of its base is 8 ft. 6 in.; what is its whole surface?

93. What is the whole surface of a cube whose side is 1 rod?

94. The base of a cylinder is one square yard, and the height is equal to the diameter; what is the convex surface?

95. One side of the base of a pentagonal prism is 53.6 yards, and the height is 25 yards; what is the convex surface?

96. The convex surface of a cylinder is 1 square yard, and the radius of its base is 20 in.; what is the height?

97. How many yards of muslin $\frac{3}{4}$ yd. wide will cover the convex surface of a cylinder 6 ft. in diameter and 12 ft. high?

Find the volume of prisms having dimensions as follows:

98. Length 12 ft., width 12 ft., and height 12 ft.

99. Length 14 ft. 8 in., width 15 ft., and height 13 ft. 6 in.

100. Length 13 ft. 4 in., width 12 ft. 10 in., and height 13 ft. 4 in.

101. Length 20 ft. 6 in., width 20 ft. 6 in., and height 18 ft.

Find the volume of each of the following cylinders:

102. Radius of base 4 ft., height 7 ft.

103. Radius of base 5 ft., height 8 ft. 6 in.

104. Radius of base 7 ft., height 11 ft. 6 in.

105. Radius of base 10 ft. 8 in., height 12 ft. 9 in.

Find the height of prisms whose volumes and bases are as follows:

106. Volume 9 cubic feet, base 5 square feet.

107. Volume 17 cubic feet 100 cubic inches, base 1 square yard.

108. Volume 1 cubic rod, base 1 square yard.

109. Volume 1 cubic mile, base 9 square rods.

Find the diameters of the bases of cylinders whose volumes and heights are as follows:

110. Volume 100 cubic feet, height 15 inches.

111. Volume 19 cubic feet 144 cubic inches, height 3 feet.

112. Volume 1500 cubic yards, height 25 yards 1 foot.

113. Volume 27 cubic feet 600 cubic inches, height 11 inches.

114. How many cubic yards must be taken out in digging a well 5 ft. in diameter and 40 ft. deep?

115. How many cubic yards of earth were taken out in digging a ditch 2000 ft. long, 9 ft. deep, and 12 ft. 6 in. wide?

116. How many gallons of water can be stored in a cylindrical vessel 12 ft. 4 in. high, the radius of whose base is 8 ft. 6 in.?

117. How many cubic feet are in a cylindrical log 50 ft. in length and 5 ft. in diameter?

Find the whole surface of the pyramids and cones whose dimensions are as follows:

118. Side of the square base 7 ft., slant height 9 ft.

119. Side of the equilateral triangular base 12 yards, slant height 17 feet.

120. Rectangular base 10 ft. by 8 ft., slant height 8 ft. 6 in.

121. Area of square base 36 sq. ft., slant height 6 ft.

122. Radius of base 2 ft., slant height 5 ft.

123. Radius of base 2 ft. 6 in., slant height 6 ft.

124. Radius of base 12 ft., slant height 12 ft.

125. Radius of base 9 ft., slant height 18 in.

126. If the area of the base of a cone is .7854 ft., and the slant side 1 ft., what is the whole surface?

Find the volumes of each of the pyramids and cones whose dimensions are as follows:

127. Base 20 sq. ft., altitude 11 ft.

128. Base 7 sq. ft. 100 sq. in., altitude 3 ft. 6 in.

129. Base 25 sq. ft. 20 sq. in., altitude 10 ft. 4 in.

130. Base 9 feet square, altitude 9 feet.

131. Radius of base 6 in., altitude 1 foot.

132. Radius of base 18 in., altitude 5 inches.

133. Radius of base 2 yards, altitude 7 feet.

134. Radius of base 4 feet, altitude 2 feet 6 in.

135. The volume of a pyramid is 18 cubic feet, and the base is 2 square feet; what is the altitude?

136. The volume of a cone is 2000 cubic inches, and the altitude is 4 feet; what is the radius of the base?

137. The volume of a cone is 27 cubic feet, and the radius of the base is 2 feet; what is the altitude?

138. The section of a cone by a plane through the vertex perpendicular to the base is an equilateral triangle, each side of which is 1 foot; what is the volume of the cone?

139. The volume of a pyramid is 34 cu. ft. 726 cu. in.; the area of the base is 5 sq. ft. 142 sq. in.; what is the height?

140. The sides of a pyramid on a square base are equilateral triangles; find the volume, one side of the base being $7\frac{3}{11}$ rd.

Find the whole surface of the frustums of pyramids and cones whose dimensions are as follows:

141. Bases regular hexagons whose sides are 12 yards and 10 yards respectively, slant height 7 yd.

142. Radii of the bases 3.5 feet and 5.5 feet respectively, slant height 4.2 feet.

143. Radii of the ends 6.25 feet and 9.125 feet respectively, slant height 10 feet.

144. Radii of the bases 11.12 yards and 12.11 yards respectively, slant height 4.5 feet.

Find the volumes of the frustums of pyramids and cones whose dimensions are as follows:

145. The ends rectangles 18 in. by 12 in. and 9 in. by 6 in. respectively, height 10 in.

146. Ends squares whose sides are 5 ft. and 6 ft. respectively, height 1 yard 2 feet.

147. Ends hexagons whose sides are 4 ft. 6 in. and 6 ft. 3 in. respectively, height 4 feet.

148. Areas of the ends 100 square inches and 36 square inches respectively; middle area 64 sq. in.; height 1 foot.

149. Radii of the ends 7 ft. and 8 ft. respectively, height 6 feet.

150. Radii of the ends 5 yd. and 6 yd. respectively, height 16 feet.

151. Radii of the ends 50 in. and 60 in. respectively, height 5 feet 6 inches.

152. Circumferences of the ends 150 in. and 75 in. respectively, height 10 feet.

Find the surfaces of spheres whose dimensions are as follows:

153. Diameter 3 yards 2 feet 6 inches.

154. Circumference 7 feet 10 inches.

155. Radius 1 yard 1 foot 1 inch.

156. Radius of a great circle 10 feet.

157. How many square yards of muslin will be required to cover the surface of a sphere whose diameter is 53 in.?

158. The circumference of a sphere is 76 in.; find the surface.

Find the volumes of spheres whose dimensions are as follows:

159. Diameter 16 feet 9 inches.

160. Circumference 3.1416 feet.

161. Circumference of a great circle 1 yard.

Find the volumes of hollow spheres having the following dimensions:

162. Inside diameter 6 feet, thickness 6 inches.

163. Outside diameter 1 foot, thickness 1 inch.

164. Inside diameter 1 foot, thickness 1 inch.

165. Find the weight of a spherical iron shot whose diameter is 10 inches, a cubic foot of iron weighing 450 lb.

166. Find the diameter of a sphere which shall be equivalent to a cube 1 ft. long.

167. If a sphere 4 inches in diameter weighs 4 pounds, what should be the weight of a sphere of the same material 8 inches in diameter?

168. If an iron ball 4 inches in diameter weighs 9 lb., what is the diameter of an iron ball which weighs 1000 lb.?

169. Find the weight of a spherical shell 2 inches thick, outside diameter 14 inches, the metal weighing 450 lb. to the cubic foot.

170. The volume of a cube is 9061 cubic inches; what is the volume of a sphere in which the cube is inscribed?

171. A sphere and a cube have the same surface; what is the ratio of their solidities?

172. A sphere has the same surface as a cylinder whose height is equal to the diameter of its base; what is the ratio of their solidities?

173. A sphere has the same solidity as a cylinder with its height equal to the diameter of its base; what is the ratio of their surfaces?

174. If a cubic inch of gunpowder weighs $\frac{8}{15}$ oz., what is the inside diameter of a spherical shell which will hold 176 oz.?

175. The weights of two balls are as 3 to $8\frac{1}{3}$; the weights of a cubic foot of the metals of which they are made are as 3 to $1\frac{1}{5}$; what is the ratio of their volumes?

REVIEW PROBLEMS.

176. A right-angled triangle, of which the base and perpendicular are 3 ft. and 4 ft. respectively, is made to turn round on the longer side; find the volume and the whole surface of the cone thus generated.

177. The surface of a certain solid is five times as great as the surface of a similar solid; what is the ratio of their solidities?

178. A rectangular field is 600 yards long and 400 yards wide; what is the length of its diagonal?

179. The perimeter of an isosceles triangle is 153 yards, and each of the equal sides is five-eighths of the third side; what is the area?

180. A cylinder, 10 ft. long and 3 ft. in diameter, is closed at each end by a hemisphere; what is the whole surface of the solid?

181. A cubic foot of iron is expanded by heat so that each face is increased 2% in area; what is the increase in volume?

182. A field contains 1 acre; how many cubic yards of earth will it require to raise the surface of the field 1 foot?

183. A field in the form of a trapezoid is to be cut into three lots by lines parallel to the parallel sides of the field; what is the width of the lots, if the area of each is 1 acre and the width of the three is 50 yards, the base being 435.6 yd.?

184. The perimeter of one square is 500 in., and the perimeter of another is 380 in.; what is the perimeter of a square which is equal in area to the other two?

185. Find the side of a cube that contains 32768000 cu. rd.

186. Find the diagonal of a square that contains 39204 sq. in., and the area of the inscribed circle.

187. A room is 31 ft. 6 in. long; what is its width, if the area is 84 sq. yd.?

188. The radius of the base of a cylinder is 6 ft., and the height is 15 ft.; what is the volume?

GAUGING.

FIND the contents in gallons of casks having the following dimensions:

189. Head diameter 25 in., bung diameter 28 in.; length 42 inches.

190. Head diameter 26 in., bung diameter 34 in.; length 45 in.

191. Diameters 24 inches and 32 inches; length 42 inches.

192. Diameters 28 inches and 35 inches; length 40 inches.

193. Diameters 25 inches and 30 inches; length 50 inches.

194. Diameters 30 inches and 36 inches; length 42 inches.

195. Diameters 12 inches and 16 inches; length 20 inches.

196. Diameters 25 inches and 33 inches; length 48 inches.

197. A barrel of wine weighs $361\frac{5}{64}$ pounds; the empty barrel weighs 100 lb.; what is the number of gallons in the barrel, if a cubic foot of wine weighs 62 lb.?

BOARD MEASURE.

FIND the number of board feet in each of the pieces of hewn timber whose dimensions are as follows:

198. 30 ft. 10 in. long, 3 ft. 4 in. wide, and 12 in. thick.

199. 75 ft. long, 2 ft. 9 in. wide, and 16 in. thick.

200. 45 ft. 7 in. long, 18 in. wide, and 9 in. thick.

201. 50 ft. long, 8 in. square at one end, and 2 ft. square at the other.

202. 60 ft. 9 in. long, 14 in. by 10 in. at one end, and 7 in. by 5 in. at the other.

Find the number of cubic feet of timber in logs having the following dimensions:

203. Diameters of the ends 4 ft. and 6 ft. respectively; length 20 ft.

204. Diameters of the ends 3 ft. 6 in. and 5 ft. 2 in. respectively; length 26 ft. 8 in.

205. Diameters of the ends 7 ft. and 6 ft. respectively; length 18 ft.

BRICK-WORK.

FIND the number of bricks 8¼ in. lon
in. thick in walls having the following d
of mortar being ¼ of an inch in thickn

206. Length 50 ft., height 40 ft., thic
207. Length 120 ft., height 54 ft., th
208. Length 400 ft., height 5 ft., thic
209. Length 75 ft., height 42 ft., thic
210. Length 18¾ ft., height 30¼ ft., t
211. Length 250 ft., height 60 ft., th

How many bricks will be required, o
in laying pavements of the following di

212. 250 feet long and 12 feet wide.
213. 1 mile in length and 10 ft. 6 in.
214. 16 feet long and 9 feet wide.
215. 1 chain 75 links in length and 1

HAY AND COAL

How many pounds of hay in stacks
as follows?—

216. In a stack of clover hay equal i
ft. 6 in. on each side.
217. In a stack of timothy hay 7 × 5
218. In a bale of clover hay which me
219. In a bale 5 × 4 × 3¼ ft., if a cub
220. How many tons of clover hay ca
which measures 30 × 20 × 10 feet?

How many tons (2000 lb.) of anthracite coal can be stored in bins having the following dimensions?—

221. 12 feet long, 4 feet wide, and 4 feet high.
222. 18 feet long, 12 feet wide, and 5 feet high.
223. 24 feet long, 18 feet wide, and 6 feet high.
224. 10 ft. 6 in. long, 5 ft. 4 in. wide, and 8 ft. high.
225. 16 ft. 4 in. long, 7 ft. wide, and 9 ft. high.

The Metric System.

1. In 56 m. 8 dm. 4 cm. 1 mm. how many millimeters?

2. In 36 Ds. how many decisteres?

3. How many times will a wheel of which the circumference is 3.25 m. turn in a distance of $10\frac{1}{2}$ Km.?

4. If a cart-wheel is 19.38 m. in circumference, how many revolutions will it perform in traveling 1257762 Dm.?

5. If the circumference of a hoop is 7.438 m., how many minutes will it take to pass over 26033 m., supposing it to turn 100 times a minute?

6. What was the speed per hour of a train which traveled 192132.35 m. in 3.65 hours?

7. Two men, A and B, began to walk together, and continued walking for 5.47 hours. A walked 6.39 Km. per hour, while B walked 5.68 Km. per hour; how many meters was B behind when they stopped?

8. If a square kilometer of land is worth $1400, how much is a square hektometer worth?

9. A square contains 289000000 a.; express in millimeters the sum of the lengths of its four sides.

10. How many steres in a room 49.38 m. long, 14.25 m. wide, and 1.5 Dm. high?

11. A merchant buys 8750 steres of wood, for one-half of which he pays 12 francs 75 centimes a stere, and for the other half 15 francs 25 centimes a stere; the measuring costs him 20 centimes a stere; how much does he gain or lose by selling it at 14 francs 10 centimes a stere?

12. A tank, 7.6 m. long and 4.9 m. wide, contains 130340 l. of water when full; how deep is the tank?

13. How many more liters are contained in a tank 30.8 dm. long, $2\frac{1}{2}$ m. deep, and 13.6 dm. wide than in one whose cubic contents are $4\frac{1}{2}$ steres?

14. A cistern contains 9 Hl. 9 dl. 9 cl. of water; in what time will it be emptied by a pipe which discharges 141 cl. in a minute? In what time will it be filled again by another pipe which pours in 213 cl. in a minute?

15. What would be the cost of papering a room 45 m. square and 18 m. high with paper costing 2.98 francs a square meter?

16. What is the weight in kilos of a cubic centimeter of gold, if 7 cubic decimeters weigh 135.5319 kilos?

17. The height of a table is $\frac{11}{7}$ of its length; what is this height, if the length is $\frac{4}{7}$ of 3.43 m.?

18. If a man earns $6\frac{1}{2}$ francs a day, and his son earns 3 francs 75 centimes a day, how long will it take them to save $31\frac{1}{2}$ francs, if their united expenses amount to 5 francs a day?

19. A brick wall is to be built 30 m. long, 18 m. high, and 73 cm. thick. How many bricks will be required, if each brick contains 1460 cubic centimeters?

20. A man walks 3 Km. 654 m. in 42 minutes; what is his rate per hour?

21. If 1 horse eats as much grass as two cows, how many days will a field of 736 Ha. support 83 horses, if 74 cows require 247 Ha. for 13 days?

22. Divide 719.6 francs among 4 men, 5 women, and 6 children, giving to each man three times as much as to each woman, and to each child half as much as to each woman.

23. How many napoleons, five-franc pieces, francs, half-francs, and sous are there in 4072 francs 45 centimes, there being an equal number of each of the first two coins, and half that number of each of the last three coins?

24. If 6 horses eat in 4 days 144 Kg. 96 g. of hay, how long will 675 Kg. 450 g. last 15 horses?

25. What number of square flag-stones, each 2 dm. 40 mm.

long, will be required to pave a rectangular footpath, 360 m. long and 4 m. wide?

26. Find the radius of a wheel that makes 5620 revolutions in a journey of 25 Km. 290 m.

27. A rectangular gate has a semicircular top; the width of the gate is 2 m. 10 cm., and the distance from the highest point of the semicircle to the bottom of the gate is 5 m. 60 cm. What is the cost of the wood of the gate, if 1 sq. m. of it costs 2 francs 50 centimes?

28. Find the simple interest of 80000 francs for $2\frac{1}{2}$ years at $4\frac{1}{2}$ per cent.

29. In how many years will 450 francs amount to 576 francs at $3\frac{1}{2}$ per cent. simple interest?

30. A man can dig 35 m. of ground of a certain width in $2\frac{1}{2}$ days; in how many days will he be able to dig 31.5 m. of the same ground of double the width?

31. A man buys a steam plow for 30807 francs 84 centimes. He plows 170 Ha. 4 a. of his own farm and $\frac{2}{3}$ of that quantity for a neighbor. The expenses are 10 per cent. on the cost of the plow; wages are 1210 francs; what is the cost of plowing a hektare?

32. If it cost 10 francs 75 centimes to gild a picture-frame containing 1 sq. m. 25 sq. cm., what should it cost to gild one measuring $3\frac{1}{2}$ sq. m.?

33. What is the weight of air in a room 5 m. long, 3 m. wide, 4 m. high, if 1 cubic decimeter of air weighs .0013 Kg.?

34. A merchant bought 15 chests of tea, each containing 36 Kg. 37 g., at 315 francs 4 centimes a chest, and sold the tea at the rate of 20 g. for 25 centimes. Did he gain or lose, and how much?

35. The wages of two masons amount, for 7 days' work of the first and 5 days' work of the second, to 45 francs 90 centimes; and for 5 days' work of the first and 7 days' work of the second, to 48 francs 66 centimes. Find the daily wages of each.

36. A cask of oil, containing $91\frac{1}{2}$ l., was sold for $42.87

What is the value of a quintal of the oil, estimated by weight, if a liter of it weighs 915.3 g.?

37. A sold a horse to B, who sold it to C at a profit of 5 per cent.; C sold it for 1071 francs, gaining thereby 20 per cent. How many francs did B give for the horse?

38. A rectangular piece of ground is 32 m. 7 dm. long, and 19 m. 5 cm. broad. Find the cost of enclosing it with a path 1 m. 5 dm. broad at 3 francs 5 centimes a square meter, (1) when the path is outside the piece of ground; (2) when the path is part of the ground.

39. Mt. Blanc is 4810 meters high; express this height in feet.

40. Express in inches the difference between the height of Mt. Blanc and that of Mt. Everest, the latter being 8840 m. above the sea-level.

41. The meter is the ten-millionth part of the distance from the equator to the pole, measured on the surface of the ocean; find the earth's circumference in miles.

42. How many steres does a room contain which is 353.17 feet long, 60 feet wide, and 27.91 feet high?

43. The area of France is 53027894 Ha.; express this area in square miles.

44. In making a railroad cutting 2558 cubic yards 25 cubic feet of earth were removed; express this quantity in cubic meters.

45. How many gallons are there in a cask containing 29 veltes—a velte being equal to 7.4505 liters?

46. Find the number of hektoliters in 57 gallons $3\frac{1}{2}$ pints.

47. A liter of alcohol weighs .792 Kg.; find the weight of a cubic foot in pounds.

48. The pressure of the atmosphere is $14\frac{3}{4}$ lb. to the square inch. What is the pressure in kilos to the square centimeter?

49. A 10-inch gun threw a solid shot of 134 lb. $5\frac{1}{2}$ oz. a distance of 4875 yds.; express the bore, weight, and range in centimeters, kilos, and meters respectively.

GENERAL REVIEW

IN

ARITHMETIC AND MENSURATION.

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1. SIMPLIFY $(\frac{1}{2} + \frac{1}{3} + \frac{1}{4}) \div (\frac{2}{3} + \frac{2}{7} + \frac{2}{9})$.

2. A, B, and C enter into a speculation with a stock of £638, on which they make a profit of £90. A had £100 in the concern for 5 months, B had £138 in for 8 months, and C £400 for 7 months. How should the profit be shared?

3. Make out the following bill, from F. S. Work to George Harris, with date, and show how it should be receipted:

$3\frac{1}{2}$ cwt. of coal, at 25 cents a cwt.; 12 lb. of butter, at $17\frac{3}{4}$ cents per lb.; $5\frac{1}{2}$ lb. of tea, at $87\frac{1}{2}$ cents per lb.; 25 lb. of sugar, at $9\frac{1}{2}$ cents per lb.; $4\frac{3}{4}$ yd. of muslin, at $10\frac{1}{2}$ cents a yd.; and 19 yd. of flannel, at $37\frac{1}{2}$ cents a yd.

4. A grocer buys 7 cwt. 3 qr. 17 lb. of sugar for $150, and pays $3.25 for freight and other expenses; at what rate must he sell it per lb. to gain 25%?

5. Multiply 5.384 by .000723.

6. What is the diameter of a circular piece of land which contains $3\frac{1}{2}$ acres?

7. Divide 50 by .025, the quotient by .25, and the second quotient by 5.

8. What is the interest of $175.75 for 191 days @ 5%?

9. If a silver cup which weighs 100 oz. 16 pwt. is made into spoons weighing 5 oz. 12 pwt. each, how many spoons can be made from it?

10. The wages of 10 men for 12 weeks is $870; what would 4 men earn in $3\frac{1}{2}$ weeks at the same rate?

11. Find the cube root of .3 to six decimal places.

12. The area of a square piece of land is 320 acres; what is the side?

13. The proceeds of a 90-day note, discounted 3 days after it was drawn, at a Phila. bank, are \$5000; what is the face?

14. What is the fourth power of the square root of 2?

15. Add $16\frac{1}{2}$, $9\frac{1}{7}$, $\frac{4}{5}$, and $\frac{3}{4}$ of $9\frac{1}{3}$.

16. How many cords in the trunk of a tree 100 ft. long, 8 ft. in diameter at one end, and 3 ft. at the other?

17. A hare has 100 yd. the start of a hound; the hare runs $7\frac{1}{2}$ yd. in $\frac{3}{4}$ of the time that the hound takes to run 12; how many yards will the hound run to catch the hare?

18. A factor receives 5% for selling, 3% for guarantee on net proceeds, and $2\frac{1}{2}$% for buying; his total commission is \$150; what amount did he sell?

19. A note of \$700 is dated May 2, 1878. Interest 7%. Indorsed: June 30, 1878, \$150; July 15, 1878, \$165; Dec. 1, 1878, \$10; what was due July 1, 1879?

20. Divide \$150 in the ratio of $\frac{1}{3}$, $\frac{1}{5}$, $\frac{1}{7}$, and $\frac{1}{9}$.

21. Find the value of $\sqrt{\frac{.2304}{3^2 \times 4^3}}$.

22. The hypotenuse is 100 ft., the other sides are equal; what is the area?

23. The interest of a debt due in 325 days is $8\frac{6}{73}$% of the principal; what is the rate %, allowing 365 days to the year?

24. How many square feet of sheet iron in a stovepipe 4 ft. long and 6 inches in diameter, allowing 2% additional for joints?

25. What is the least common multiple of the odd numbers from 1 to 15 inclusive?

26. The weight of an empty cask is 100 lb.; if the cask is filled with water the weight is 740 lb.; how many gallons does the cask contain?

27. What is the weight of the wheat in a bin 30 ft. long, 6 ft. wide, and 6 ft. high?

28. What is the present worth of \$75.50, due in 4 yr. 10 da., at 7%?

29. The selling price is \$300; the loss is equal to $11\frac{1}{2}\%$ of the selling price; what is the loss % on the cost?

30. If I pay \$3000 to my principal, and my commission was $2\frac{1}{2}\%$, what was the amount of my sales?

31. Divide 7 thousand by 70 thousandths, and multiply the quotient by 7 millionths.

32. If I purchase goods on 3 mo. credit for \$1000, and sell them at once for \$1200 cash, what is my % of profit, money being worth 6%?

33. Find the face of a 90-day note, discounted in New York on the 10th day after its date, the net proceeds being \$1870, and the rate 7%.

34. If it cost \$360 to keep 12 horses for 7 mo. when oats are worth 40 ct. per bu., how many horses can be fed 6 mo. for \$1200 when oats are worth $26\frac{2}{3}$ ct. per bushel?

35. When it is 12 o'clock noon at the island of St. Helena, 5° 54′ west longitude, what is the time at a place which is in 5° 54′ east longitude?

36. Divide \$1.75 into two parts, one of which shall be $16\frac{2}{3}\%$ less than the other.

37. Change 7 oz. Troy to the fraction of a pound Avoirdupois.

38. If 7 men earn $\$3\frac{1}{4}$ in $\frac{3}{5}$ of a day, in how many days will 3 men earn $\$17\frac{3}{11}$?

39. When U. S. 6's are bought at $112\frac{1}{2}$, what is the % of income on the investment?

40. What % is gained in buying milk by beer measure (282 cu. in. = 1 beer gallon) and selling it by liquid measure?

41. I rent my house at \$30 a month, and pay \$75 a year for taxes and repairs; what is the value of the house if my net profit is 5% per annum?

42. If a rectangular lot of ground is worth \$800, what is the worth of a similar lot whose length and width are each 50% greater?

43. If goods are bought at 50% below their first cost and sold at 50% above their purchase price, what % of their first cost is this selling price?

44. In what time will \$590 gain \$76.70 at 4%?

45. Three men engage in trade; A furnishes \$900, and C \$650; they gained \$725. B's gain was \$125; what was his amount of stock?

46. What sum should be discounted at a Baltimore bank for the present payment of \$1000 due in 60 days, interest and discount being each 6%?

47. The whole surface of a cylinder is 10 sq. yd.; the diameter equals the height; what is the solidity?

48. What is the amount of \$250, at 5% compound interest, for 5 years and 6 months?

49. How many tons of anthracite coal can be put in a bin that is 20 feet square and 5 feet high, allowing 54 lb. of coal to the cubic foot, and 2240 lb. to the ton?

50. My loss is equal to $12\frac{1}{2}\%$ of the selling price; the cost is what % of the selling price?

51. How many minutes and seconds does the earth move in 1 day, if $365\frac{1}{4}$ days make a year?

52. What was the value of a dollar in currency when gold was quoted at $110\frac{1}{2}$?

53. Find the amount of \$1111.11 from Mar. 8, 1878, to Jan. 15, 1879.

54. What is the length of a line parallel to the base that will cut off $\frac{1}{2}$ of the area from a triangle whose base is 50 ft.?

55. What is the weight of 500 miles of iron wire $\frac{1}{4}$ in. in diameter, a cubic ft. weighing 480 lb.?

56. If a commission merchant has \$1980 to expend, which includes his commission of $2\frac{1}{2}\%$, what amount of goods can he purchase?

57. What is the square root of 2 to six decimal places?

58. Sold $\frac{1}{3}$ of a ship for as much as $\frac{2}{5}$ of the ship cost: what is my % of profit?

59. Paid \$37.50 for the insurance on a house worth \$5000, at $1\frac{1}{2}\%$; what is the amount insured?

60. What is the rent of a house from Mar. 1, 1878, to Feb. 14, 1879, at \$43.75 per month?

61. The bank discount of a note of $1500 was $16; what was the time named in the note, it having been discounted in Pittsburg at 6% on the day it was dated?

62. Find the radius of a circle whose area is 1 sq. chain.

63. If I sell tea at 40 ct. a pound, I gain 3 times as much money as I do by selling it at 36 ct. a pound; what is the cost of the tea?

64. Bought a 10% stock at 120, kept it 18 months, and sold it at 118; what % did my investment pay?

65. At what price must I buy stock so that by selling it at 90 I may realize 10% on the investment?

66. Bought a quantity of apples for $8.40; had I received 3 pecks more, each peck would have cost me $\frac{4}{5}$ as much; what did the apples cost per bushel?

67. Sold a horse at a loss of 20%; had I received $10 more, my loss would have been $\frac{1}{3}$ less; what was the selling price?

68. Find the cube root of .009 to five decimal places.

69. Liquor worth $2.50 a gallon has been reduced in value to 1.87\frac{1}{2}$ a gallon by the addition of water; what is the % of water added to a gallon?

70. A grocer sold a hogshead of molasses at the rate of 50 cents a gallon, and, allowing 5% for bad debts and 5% for collecting, made a clear gain of 5%; what was the first cost of the molasses per gallon?

71. For what amount must I give a 90-day note in a Baltimore bank to obtain $500?

72. How many feet of inch boards could be cut from a log 40 ft. long and 16 in. square, allowing $\frac{1}{4}$ in. for each saw-cut?

73. I buy U. S. 6's at 108, and after three years they are redeemed; what % did they pay me?

74. A publisher sells to the trade 40 copies of a book at the retail price of 24 copies; what does he receive for a book at wholesale which retails at $1.50?

75. A bar of metal 6 ft. long, 4.5 ft. wide, and 1.5 in thick is cast into a cube; what is the length of the side?

76. I owe \$10000, $\frac{1}{3}$ in 6 mo., $\frac{1}{2}$ in 10 mo., and the remainder in 1 year; what is the present worth of the debt?

77. What is the length of the longest straight line that can be drawn in a cubical room whose volume is 15625 cubic feet?

78. If I rent a house that cost \$5000 for \$25 a month, and pay 2% on $\frac{3}{5}$ of its value in taxes and \$25 a year for repairs, what % does the house pay me?

79. What is the side of a cubical bin that will hold 10 tons of anthracite coal of 2240 lb. each?

80. How much is $33\frac{1}{3}\%$ of $16\frac{2}{3}\%$ of $6\frac{1}{4}\%$ of \$18.75?

81. The volume of a sphere is 10 cubic feet; what is its surface?

82. When City 6's are selling at 114, what sum must be invested in them to yield an income of \$1500 a year?

83. What is the value, at \$9.50 a cord, of a pile of hickory wood 30 ft. 4 in. long, 8 ft. wide, and 10 ft. high?

84. Divide .002 by eight millionths.

85. Multiply six thousandths by six and six thousandths.

86. What is the value of a permanent income of \$1550 a year, interest at $4\frac{1}{2}\%$?

87. If a cylindrical stack of hay 6 ft. high weighs 4000 lb., what is the weight of a stack whose height is the same and diameter twice as great?

88. If the factors of a certain number are $2\frac{1}{8}$, $3\frac{1}{5}$, and $4\frac{3}{7}$, what is $\frac{3}{8}$ of $2\frac{1}{2}\%$ of the number?

89. If a merchant can pay but $16\frac{2}{3}$ cents on the dollar, how much can he pay on a debt of $\$16\frac{2}{3}$?

90. Express in a proportion the ratios $\frac{7}{9}$, $\frac{21}{27}$.

91. In what time will \$425 gain \$31.875 at 5%?

92. How many balls of cast iron 2 inches in diameter are equivalent in weight to a ball 12 inches in diameter?

93. Find the equated time of \$750 due in 15 days, \$300 in 3 months, and \$75 due in 1 year.

94. Bought \$10000 U. S. 4's at $100\frac{1}{2}$; what is my annual income?

95. Goods marked at 75% above cost are sold at 33⅓% below the price marked; if 10% is then allowed for prompt payment, what is the % of profit?

96. How many bricks 8½ by 4¼ will be required to pave a yard 100 ft. long and 60 ft. wide?

97. What will be the proceeds of a note discounted in New York, the time for which it is drawn being 60 days, the face $950, and the rate 7%?

98. If 15% of the price obtained for goods is gain, what is the gain %?

99. What is the value of $\sqrt[3]{\frac{117}{216} + \frac{1}{27}}$?

100. If 1000 feet of inch pine lumber weigh 1800 lb., what is the weight of a pine plank 20 ft. long, 4 in. thick, and 18 in. wide?

101. If a solid cylinder of iron 10 inches in diameter weighs 100 lb., what is the weight of a cylinder 20 inches in diameter and of the same height as the other?

102. Divide 112 into two parts in the ratio of ½ and ⅛.

103. What is the fourth power of .005?

104. The height of a room is 16 feet, the width is 14 feet, and the length is 20 feet; what is the length of the longest straight line that can be drawn in the room?

105. The true discount of a debt due in 18 mo. is $18.30; what is the debt, money being worth 6%?

106. The bank discount, at 6%, on a note dated Feb. 1, 1878, for 3 months, discounted in Baltimore Mar. 3, was $30.60; what was the face of the note?

107. A room is 20 ft. square and 20 ft. high; if each side of the floor were 10 ft. longer, how much greater would the entire surface of the room be?

108. A merchant owes $1000, payable in 9 mo.; if he should pay $200 in 2 mo. and $600 in 4 mo., how long should he keep the remainder?

109. The area of the largest circle that can be drawn on the surface of a sphere is 1 sq. foot; what is the solidity of the sphere?

110. A sidereal day is 23 h. 56 m. 4 sec. mean solar time; how many sidereal days in $365\frac{1}{4}$ solar days?

111. What fraction of a pound Troy is $\frac{5}{7}$ of a pound Avoirdupois?

112. What decimal of a square yard is .02 of a sq. in.?

113. In what time will \$200 gain \$3.76, at $7\frac{3}{10}\%$ interest?

114. The diagonal of a square is 1 mile; what is its area?

115. How many bushels of corn can be stored in a bin whose capacity is 1200 gallons wine measure?

116. What is the true present worth of \$7500, due in 1 year 7 mo., at 8%?

117. How many board feet in 30 pieces of hewn timber, each 40 ft. long, 3 ft. wide, and 18 in. thick?

118. For what sum must a 90-day note be given in a New York bank (rate 7%), to obtain \$3000?

119. What is the surface of a sphere whose solidity is one cubic foot?

120. Divide 9 mi. 150 rd. 6 in. by .7.

121. When currency is at 20% discount, what is the premium on gold?

122. A broker sold 6% stock at 105, and invested the net proceeds for the owner in another 6% stock at 103, brokerage $\frac{1}{2}\%$ on each transaction; what rate does the investment pay?

123. Find the average term of credit of \$600 due in $4\frac{1}{2}$ mo., \$625 due in 3 mo. 10 da., and \$500 due at once.

124. If the ratio is $3\frac{1}{4}$ and the consequent 12, what is the antecedent?

125. A, B, and C gained \$5000 in a business to which A contributed \$1200 for $3\frac{1}{2}$ mo., B \$2000 for a year, and C \$500 for 18 mo.; what was each man's share?

126. Find the least common multiple of 343, 5929, 7007, 8281, and 16807.

127. What is the difference in weight between 9 lb. 10 oz. of gold and 9 lb. 10 oz. of copper?

128. What is the interest on \$1990 for 2 yr. 3 mo., at 5%?

129. At what price must a $7\frac{3}{10}\%$ stock be bought to pay 10% on the investment?

130. If I sell goods at $\frac{5}{8}$ of their cost, what % do I lose?

131. If I sell $\frac{3}{8}$ of a vessel for what $\frac{5}{7}$ of the vessel cost me, what % do I gain?

132. What is the rate of premium on 6% stock when the investment pays $5\frac{1}{2}\%$?

133. An insurance company takes a risk at 10% on $\frac{1}{2}$ the value of a vessel; the vessel being wrecked, the company's loss is \$10000; what was the value of the vessel?

134. At what % will \$1100 amount to \$1254 in 3 years 1 month and 10 days?

135. The square root of 64 is the cube of what number?

136. Sold 50 shares of stock that cost me \$50 a share at a loss of 25%, and invested the proceeds in a 6% stock at 120; my income is what % of the original investment?

137. If a bar of railroad iron weighs 60 lb. to the linear yard, what % must be added to each of its dimensions to make it weigh 75 lb. to the yard?

138. Received \$25.55 as interest on a loan of \$2000, the rate being 10%; what was the time?

139. How many gallons will a cask hold whose head and bung diameters are 20 and 24 inches respectively, the length being 30 inches?

140. What is the exact interest on \$10000 at 7% from April 1, 1879, to December 1, 1879, inclusive, 365 days to the year?

141. What is the expense of carpeting a room 17 ft. 6 in. long by 14 ft. wide with carpet $\frac{7}{8}$ yd. wide, at \$1.25 per yd.?

142. If 25 yards of cloth cost £17 14 s. 9 d., how much will $18\frac{3}{4}$ yards cost?

143. Find the cost of 1 mile of iron piping 36 inches inside diameter and 1 inch thick, the price of the iron being \$40 per ton of 2000 lb., and 5% being added for overlap.

144. Divide \$2420 in the ratio of $\frac{1}{5}$, $\frac{2}{3}$, and $\frac{7}{8}$.

145. Water consists of 1 part of hydrogen to 8 of oxygen by weight. What is the weight of the hydrogen in a gallon of water, one pint of water weighing 1.042$\frac{3}{4}$ lb.?

146. A block of stone 4 ft. long, 2$\frac{1}{2}$ ft. wide, and 18 in. thick weighs 2241 lb.; what is the weight of a piece which measures 6 in. on each of its square sides?

147. If the present worth of $200 due 3 years hence is $106, what is the present worth of $1500 due in 5 years at the same rate?

148. The average age of $\frac{1}{3}$ of the boys in a school is 10 years, the average age of $\frac{1}{4}$ of the remainder is 12 years, and that of the rest of the boys is 15$\frac{1}{2}$ years; what is the average age of all the boys in the school?

149. A cubic foot of gold will gild 3000000 square feet of surface; what is the thickness of the gilding?

150. If goods are sold for $1.75 at a loss of 12$\frac{1}{2}$%, what is the cost?

151. If $\frac{5}{11}$ of an acre of land cost $45.25, what is the value of 39$\frac{1}{9}$ acres?

152. Find the cube root of 27.1 to 5 decimal places.

153. What is the interest of $365.25 for 3 yr. 5 mo. at 4$\frac{1}{2}$%?

154. On what day after it is drawn must a 90-day note be discounted at a Philadelphia bank in order to realize $1000, the face of the note being $1010.10?

155. A conical stack of well-settled timothy hay, 15 ft. in diameter and 12 ft. high, was sold at $15 per ton of 2000 lb.; what was its value?

156. Books marked at 40% above cost are sold at a deduction of 12$\frac{1}{2}$% on the price asked; what is the % of profit?

157. I invest in 6% stock at 104, and after 2 years I sell at 106; what % have I made on my money?

158. The old Paris foot equals .32484 meter, the meter equals 3.2809 feet, the foot equals .97114 of a Prussian foot; what is the value of a Paris foot in Prussian feet?

159. Find the square root and cube root of 260.

160. Multiply three billionths by two thousandths.

161. What is the amount of $1666.66\frac{2}{3}$ for 2 yr. 2 mo., at 7%?

162. A property worth $2550 is to be divided in the ratio of $2\frac{1}{8}$ to $\frac{9}{16}$; what is the value of each share?

163. In the following account, when is the balance due, and what is the cash balance on the 1st of January, 1879?

Dr. *James Freeman.* *Cr.*

1878.				1878.			
May 1,	To Mdse. @ 3 mo.	$1500	00	June 3,	By Cash	$1000	00
June 10,	" " " 4 "	1800	00	July 10,	" Note at 60 da.	2000	00
July 5,	" " " 5 "	1250	00	Oct. 15,	" Cash	800	00

164. Divide 217 mi. 218 rd. 2 yd. 2 ft. 1 in. by 506 mi. 103 rd. 1 yd. 2 ft. 7 in.

165. What must be the inside diameter of a hollow sphere that will contain 10 gal. of water?

166. Bought 100 tons of coal (2240 lb. each) at $4 per ton, and sold it at $5.75 per ton of 2000 lb.; what was my total profit and gain %?

167. If 30 yd. of cloth $1\frac{1}{2}$ yd. wide can be made from 27 lb. of wool, how much cloth $1\frac{1}{4}$ yd. wide can be made from 15 lb. 8 oz. of wool?

168. What is the cost of 17 A. 19 rd. of land, at $35.75 per acre?

169. If I gain 5% by selling an article for $21, what shall I gain or lose by selling it at £5 4 s., a pound sterling being equal to $4.8665?

170. Change 40 rd. $17\frac{1}{2}$ ft. to the decimal of a mile.

171. The diameter of the earth is about 41772730 feet; find the value of a meter, which is one ten-millionth of a quadrant of the circumference.

172. A merchant hires money at 7% for a year, and buys grain at 80 cents a bushel. He sells it immediately at $1.15 per bu. for cash; what % does he make if money is worth 6% a year?

173. A commission-merchant sells goods to the amount of $7000, and invests the net proceeds in cloth at $5 a yard. His commission is 3% for selling and 2% for buying; how much cloth does he buy?

174. A cubic foot of cast iron weighs about 450 lb.; what is the weight of a hollow iron shell $12\frac{1}{2}$ in. outside diameter and $1\frac{1}{4}$ in. thick?

175. A poor man borrowed $20, which he repaid in eleven monthly instalments of $2 each; what was the annual rate of interest (reckoned as simple interest)?

176. At what % will $650.25 amount to $700 in 8 mo. and 12 da., by the business method?

177. Sold a piano at such a price that $\frac{5}{8}$ of the gain was equal to $\frac{2}{3}$ of the cost; what was the gain %?

178. Divide $\frac{2}{3}$ of $\frac{7}{8}$ of .25 by $\frac{1}{2}$ of $\frac{1}{4}$ of 1.5.

179. The solidity of a cylinder 10 ft. in length is 25 cubic ft.; what is the diameter?

180. How many yards of carpet $2\frac{1}{4}$ feet wide are equal to $9\frac{1}{2}$ yards $\frac{7}{8}$ of a yard wide?

181. What is the difference between true discount and bank discount on $5000 for 4 months, at 7%, not reckoning days of grace?

182. Paid $125 for a horse. At what price must he be sold so that the per cent. of loss shall be $\frac{1}{8}$ the cost of the horse?

183. What fraction must be multiplied by $3\frac{7}{8} \div \frac{1}{8}$ that the product may be $1\frac{1}{4}$?

184. If 4 gal. 3 qt. 1 pt. of milk can be exchanged for 2 qt. $1\frac{1}{2}$ pt. of honey, how much honey should be received for 9 gal. $1\frac{1}{2}$ pt. of milk?

185. In what time will $3025 produce $111.75 at 6%?

186. What is the inverse ratio of $31\frac{1}{2}$ yd. to $1\frac{1}{2}$ miles?

187. A brick wall is 2 ft. thick, 12 ft. high, and 1029 yards long. Suppose the bricks to have been built into a cube, what would the side have been?

188. If 25 gross of pens cost 1 s. 10 d. a gross, and are sold at 1 s. 6 d. per hundred, what is the % of profit?

189. What must I pay for a 10% stock that it may yield me 8% income?

190. What is the correct interest on $1680.50 for 6 mo. and 12 da., at 7%? What is the interest by the business method?

191. A can do a piece of work in 6 hours, B in 5 hours, and C in $4\frac{1}{2}$ hours. They all work together until 2 hours and 10 minutes before the work is finished, when B stops. C stops $1\frac{1}{2}$ hours before A, who completes the work. In what time was the entire work finished?

192. A note for $1300, dated July 1, at 120 days, was discounted July 27, in Boston, at 6%. Find the proceeds.

193. There are two copper kettles of the same weight and shape; one is made of metal twice as thick as the other. If the one of thicker metal holds a gallon, what will the other hold?

194. Find the cube root of 738518126319.

195. What is the radius of a circle if the area is 1 sq. yd.?

196. How many board feet in 125 pieces of plank, each 17 ft. 6 in. long, 4 ft. 6 in. wide, and 7 in. thick?

197. How many tons of clover hay in a well-settled tapering stack which measures 8 ft. by 6 ft. at the bottom, 6 ft. by 4 ft. at the top, and whose altitude is 10 ft.?

198. How many tons of anthracite coal, 2240 lb. to the ton, can be stored in a space 150 ft. long, 60 ft. wide, and 8 ft. deep?

199. What part of 25 tons 6 cwt. 3 qr. 10 lb. 11 oz. is 23 tons 11 cwt. 1 qr. 1 lb. 1 oz., allowing 2240 lb. to the ton?

200. A reservoir has two delivery-pipes, one which will empty it in $3\frac{1}{2}$ hours and the other in 9 hours. How soon would it be emptied if both were opened?

201. What is the bank discount on a 60-day note for $1000, discounted at a New York bank 4 days after it was drawn? (Legal interest 7%, time 1 day less than in Philadelphia.)

202. Reduce $\frac{25217777}{86268018}$ to its lowest terms.

203. At what times are the hands of a clock together?

204. What is the greatest common measure of 4884862 and 3124018?

205. What is the compound interest of $1500 for 7 years at $4\frac{1}{2}\%$?

206. How many feet of boards in 25 boards, each 10 feet long, 12 inches wide at one end and 18 inches at the other?

207. Reduce to its lowest terms $\frac{875751}{668697}$, and change the result to a decimal of four places.

208. In what time will money double itself at 10% per annum, compound interest?

209. The gain % is 5, the selling price $6; what is the cost?

210. When gold is at $108\frac{1}{2}$, what is the value of $1 in currency?

211. What is my per cent. of loss on goods sold on 3 months' credit at 5% below cost, money being worth 6% a year?

212. How many bricks $8\frac{1}{2}$ inches long by $4\frac{1}{4}$ inches wide will it require to pave a space 100 ft. long and 12 ft. wide?

213. The parallel sides of a trapezoid are 5 chains and 15 chains, the perpendicular distance is 100 yd.; what is the area?

214. How much brandy can be purchased for $5, if a hogshead is worth $250?

215. Change 13 min. $7\frac{1}{2}$ sec. to the decimal of an hour.

216. A conical wine-glass, 2 in. in diameter and $2\frac{1}{2}$ in. deep, is half filled with water; what is the depth of the water?

217. Divide $\frac{2\frac{1}{4}}{9\frac{3}{7}}$ by $\frac{5}{13}$ of $5\frac{4}{7}$, and multiply the result by $\frac{3}{5}$.

218. What thickness of cast iron will be equal in weight to a plank of maple 12 in. thick?

219. A bankrupt's assets are £625 5s. 9d., his debts are £4575 18s. 2d.; what % can he pay on the pound?

220. A block of marble is 6 ft. long, 3 ft. 6 in. wide, and 2 ft. 2 in. thick; what is its weight?

221. My income on a 4% stock is $4\frac{3}{8}\%$ on the investment; at what price was the stock purchased?

222. If 15 horses or 148 sheep can be kept 13 days for £12 6 s. 6 d., what sum will keep 10 horses and 150 sheep for 25 days?

223. How much heavier is an ounce of gold than an ounce of sugar?

224. Two trains pass each other in $1\frac{1}{2}$ seconds when moving in opposite directions; when moving in the same direction the faster train passes the other in 6 seconds; what is the speed of each if their respective lengths are 300 ft. and 500 ft.?

225. Change 1 min. $5\frac{5}{6}$ sec. to the decimal of $\frac{1}{24}$ of a lunar month.

226. The selling price is $12\frac{1}{2}$ ct., and the gain $33\frac{1}{3}\%$; what is the cost?

227. A merchant bought 3 pieces of cloth for \$63.84; each piece contained the same number of yards. How many yards in each, if the prices were \$.64, \$.74, and \$.90 per yard, respectively?

228. John bought pears at $1\frac{1}{3}$ cents apiece, and twice as many at $1\frac{1}{8}$ cents each, and sold them all at $1\frac{2}{3}$ cents each, How many pears did he buy, if his profit was $\$.25\frac{1}{2}$?

229. If 15 men can do a piece of work in $12\frac{1}{2}$ days of 10 hours each, in how many days of 8 hours each could 50 men do $3\frac{1}{4}$ times as much work, the latter work being 25% easier than the former?

230. What is the inverse ratio of $7\frac{1}{8}$ to $\frac{2}{3}$?

231. Raise .002 to the fourth power, and find its square root.

232. How many feet of boards will it require to lay a floor which is 29 ft. long by 24 ft. 6 in. wide?

233. If $\frac{3}{5}$ ℥ of quinine will fill 36 prescriptions, how many can be filled from 1 lb. Avoirdupois?

234. What is the diameter of a cylindrical cistern that will hold 3000 gal., the depth being 15 ft.?

235. If 25% of my sales is profit, what % do I gain?

236. What is the interest of £15 17 s. 10 d. for 1 yr. 8 mo. at 6%?

237. What insurance must be paid to cover the value of $2500 and the premium of $2\frac{1}{2}\%$ on the same?

238. How long must a piece of land be to contain 5 acres, when the width is 200 yards?

239. How many sq. ft. in the surface of a cube whose solidity is 12 cubic feet?

240. An insurance company took a risk on $\frac{7}{8}$ of a vessel at $3\frac{1}{2}\%$, and reinsured $\frac{1}{8}$ of the risk in another company at $3\frac{1}{4}\%$. The difference in the premiums was $120; what was the value of the vessel?

241. What is the present worth of $1300, due in 4 years, at 10%, compounded annually?

242. If my profit is $18\frac{1}{2}\%$ by selling goods at $.55$\frac{1}{2}$ above cost, at what price must I sell to realize 25% profit?

243. What rate of interest does a bank receive by discounting 60-day notes at 7%?

244. Bought some old copper at $.20 a lb.; it lost 5% in melting; at what price per lb. must it be sold to gain 50%?

245. The bank discount on a note of $160, dated Jan. 1, 1879, at 60 days, discounted in Philadelphia Jan. 16, was 1.52\frac{4}{9}$; what was the rate %?

246. What is the weight of a well-settled stack of clover hay in the form of a cone, diameter of the base 10 ft. and perpendicular height 15 feet?

247. How many square inches of leather will be required to cover a foot-ball 12 inches in diameter?

248. Divide three ten-millionths by five thousandths.

249. How large a piece of square timber can be sawed from a log 36 inches in diameter?

250. How many bricks $8\frac{1}{2}$ by $4\frac{1}{4}$ in. will be used in paving a yard 350 ft. long and 100 ft. wide?

251. Find the difference between $\sqrt[3]{5^6}$ and $\sqrt{9^4}$.

252. The sum of two numbers is $37\frac{1}{2}$, and their difference is 18; what are the numbers?

253. If \$190 will earn \$9.50 in 3 mo. 10 da., at 18%, what will \$980.25 earn in 1 yr. 9 mo. 17 da., at 8%?

254. If $\frac{5}{7}$ of a vessel cost \$14244$\frac{5}{7}$, what will 12$\frac{1}{2}$% of the vessel cost?

255. In the proportion $\frac{3}{4} : ? :: 1\frac{3}{5} : \frac{2\frac{1}{4}}{3\frac{1}{6}}$, what is the second term? Change the proportion to its simplest form.

256. What is the cube root of 27^6?

257. An express-train is running at the rate of 40 mi. an hour; how long will it be in overtaking a mail-train which is 40 mi. ahead and running at the rate of 30$\frac{1}{2}$ mi. per hour?

258. Multiply 19 ft. 9′ 9″ by 7 ft. 9′ 3″.

259. What is the weight of 50 yd. of lead pipe 1 inch in outside diameter and $\frac{3}{16}$ inch in thickness?

260. What is the depth of a cylinder that will hold a bushel, the diameter being 12 inches?

261. What are the proceeds of a 60-day note, discounted in Wilmington, Del., for \$2250, at 6%?

262. In what time will money double itself at 5% compound interest?

263. What decimal of an acre is .315 of a square inch?

264. If a piece of cloth shrinks 5% in length and width in sponging, how many yards in length, $\frac{3}{4}$ yd. wide, should be purchased to make a suit which requires 10 square yards?

265. $\frac{3}{8}$ of a lot of goods were sold for the cost of $\frac{5}{8}$, and $\frac{5}{8}$ were sold for the cost of $\frac{1}{2}$; what was the gain or loss % on the whole by both sales?

266. Sold goods at 40% off, and 3% off the bill for cash; what was the rate of discount?

267. What is the length of the diagonal in a rectangle whose sides are 250 rd. and 325 rd. respectively?

268. If I pay \$299.26 interest on \$430.28 for 5 years 4 months and 6 days, what is the rate per cent.?

269. My commission for selling is 5%, and for buying with the net proceeds it is 3%; what is the amount of my sales if my total commission is \$750?

270. Find the difference between the simple and the compound interest of $365 for 3 years and 6 months, at 4%.

271. What is the equated time for paying a debt, $\frac{1}{5}$ of which is now due, $\frac{1}{3}$ in 30 days, and the remainder in 65 days?

272. How much does a man gain or lose in a year by borrowing $20000 from a bank at 6% discount and lending the proceeds at $6\frac{1}{2}$% interest?

273. If 54211 bricks $8\frac{1}{4} \times 4\frac{1}{8} \times 2\frac{3}{8}$ in. are required to build a wall 60 ft. long, 35 ft. high, and $17\frac{1}{2}$ in. thick, how many bricks $8\frac{1}{2} \times 4\frac{1}{4} \times 2\frac{1}{4}$ in. will be required to build a wall 175 ft. 6 in. long, 30 ft. high, and $13\frac{1}{3}$ in. thick?

274. Find the interest on $25000 U. S. 6's from Jan. 1, 1879, to Sept. 18, 1879, both days inclusive.

275. Find the prime factors of 79794.

276. If my loss equals 2% of my sales, what is my loss %?

277. What is the whole surface of a triangular pyramid each of whose equal sides is 1 yard?

278. What is the present worth of $875, due Dec. 1, 1880, if paid Aug. 15, 1879, money being worth 8%?

279. Change to its lowest terms $\frac{7515024}{1188994}$, and find its value to five decimal places.

280. What would be the cost of paving a hall 150 ft. long by 50 ft. wide with marble slabs 12 in. long by 9 in. wide, the price of the slabs being $25 per dozen?

281. Sold stock at $93.10, thereby losing 5%; what was the cost?

282. The premium is $375, the rate $2\frac{1}{2}$%; what is the amount insured?

283. If a post 11 ft. in height casts a shadow 9 ft. 9 in. long, what is the height of a house which casts a shadow 45 ft. 10 in. long?

284. What is the amount of £570 9 s. 6 d. for 3 yr. 4 mo., at 7%?

285. Paid $840 for insuring a house worth $56000; what is the rate of premium?

286. A can do a piece of work in 10 hours, B in 5 hours, and C in 4 hours. A works till it is finished, B stops $1\frac{1}{2}$ hours and C $1\frac{1}{4}$ hours before it is completed. In what time was the whole work done?

287. 12 boys in a class have a general average of 60.2, 15 have an average of 75.9, 13 have an average of 50.2; what is the average of the class?

288. What bulk of gold will be equal in weight to 10 cubic feet of silver?

289. What fraction of a scruple is a pennyweight?

290. The net proceeds are \$1420, the rate of commission $3\frac{1}{2}\%$; what is the commission?

291. What part of $\frac{2\frac{1}{3}}{4}$ is $\frac{3\frac{1}{3}}{7}$?

292. If my property is worth $33\frac{1}{3}\%$ more than my brother's, what % less than mine is his worth?

293. If my loss is equal to 20% of my selling price, what is my loss %?

294. A 6-inch globe of metal is hammered into a circular plate $\frac{1}{2}$ in. thick; what is the diameter of the plate?

295. A cask filled with water contains 120 gallons; what is the weight of the empty cask, the entire weight being 1040 pounds?

296. The surface of a sphere is 25 sq. ft.; find the volume.

297. The longitude of Cairo is 31° 15′ 30″ east; find the difference of time at a place 63° 35′ 30″ west.

298. After deducting 5% commission, what will an agent invest for a man who sends him \$1900?

299. The selling price is \$1300, loss 9%; what is the cost?

300. Find the cube root of $\frac{9^6 \times 3^2}{1.5 \times 6}$.

301. How many gallons in a conical cistern 10 ft. deep, the upper diameter 6 ft., the lower diameter 4 ft.?

302. Divide \$1000 into two parts, so that one part shall be 50% more than 50% of the other.

303. $19\frac{1}{2}$ is $19\frac{1}{2}\%$ less than $19\frac{1}{2}\%$ of what number?

304. A cistern is supplied by a constant stream of water, and can be emptied by means of 9 delivery-pipes of equal capacity. If six of the pipes are opened, they will lower the contents 1200 cubic feet in 10 hours; if all the pipes are opened, they will lower the contents 1200 cubic feet in $5\frac{5}{7}$ hours. How many gallons does the cistern receive in an hour?

305. At what rate must a 30-day note be discounted to produce $6\frac{2}{6}\frac{2}{5}\%$ interest?

306. A, B, C, and D purchased 3728.88 yards of a certain material, as follows: A paid 9% more than B, and received 9% less in length; B paid 9% less than C, and took 10% more in length; C paid 7% more than D, and took 12% less in length. They bought the whole for \$41050.33; what did each pay, and how many yards did each receive?

307. What part of 1 A. 3 chains is the sum of 165 sq. ft. 5′ 9″ 10‴ 11⁗ and 7 sq. yd. 27 sq. ft.?

308. The wine gallon contains 231 cubic inches, and the imperial English gallon contains $277\frac{274}{1000}$ cubic inches. How many imperial gallons are there in 157 wine gallons?

309. A yearly pension which has been forborne for 12 years, at 6% compound interest, amounts to \$1049.0284805; what was the pension?

310. If the relative value per pound of wheat to rye, as an article of food, is $9\frac{1}{2}$ to $7\frac{3}{4}$, and that of rye to potatoes $14\frac{1}{4}$ to $5\frac{3}{8}$, how much cheaper by the bushel is wheat at \$1.25 than potatoes at \$.66, the weight of each per bushel being 60 lb.?

311. A man owed \$1800 as follows: \$300 to be paid down, \$600 to be paid in 8 months, \$400 in 9 months, and the remainder in 12 months; in payment of the whole he agreed to give two notes, each for one-half of the whole debt, made payable at such dates that one note had six months longer to run than the other. When were these notes due?

312. A man bought 3 houses for \$12000, and sold them as follows: On the first he gained 60%, on the second he gained 20%, and on the third he lost 4%. As he received the same amount of money for each house, what was the cost of each?

313. Bought 18 apples at a certain price; if I had received two apples less for the money, they would have cost me 1 cent per dozen more; what did I pay for the apples that I bought?

314. If 150 sq. ft. of carpet will cover the floor of a room, how many yards will be needed if the width is 2 ft. 3 in. and the loss in matching is $6\frac{1}{2}\%$?

315. Paid 16 cents for some fruit—peaches at 4 for a cent, and pears 2 for a cent. I sold $\frac{1}{5}$ of the peaches and $\frac{1}{3}$ of the pears for cost, which was 4 cents; what number did I buy of each?

316. A and B have equal sums of money; A loses $\frac{1}{8}$ of his money, and B gains \$100; B then has three times as much as A. How much did each have at first?

317. A has 10% more than B, B 10% more than C, C 10% more than D, and D 10% more than E, and all together have \$61051; how much has each, and what % less than A's is E's?

318. What decimal of .8$\frac{1}{3}$ sq. in. is .8$\frac{1}{3}$ inches square?

319. A broker having sold goods at 5% commission invests the net proceeds of the sale in other goods, at 3% commission; if his whole commission was \$120, what was the amount of the sale?

320. A merchant has a 60-day note discounted in Boston on the day of date, the proceeds being \$500. For what sum must he draw a 30-day note, discounted at 5%, to take up the first note?

321. If a certain number be increased by 50% of itself, and the sum thus obtained be increased by its $\frac{1}{5}$ and 4, the result will be double the original number. What is the number?

322. A, B, C, and D purchase a house for \$9000. If A, B, and C give all their money toward paying for it, D must give \$1500; if B, C, and D give all theirs, A must give \$200; if C, D, and A give all theirs, B must give \$700; and if A, B, and D give all theirs, C must give \$1200. How much money has each?

323. A merchant sold a quantity of tea at \$1.04 a pound, and gained 17%; the same day he sold of the same tea to the amount of \$96, $33\frac{1}{3}\%$ of which was clear gain. How many pounds did he dispose of in the last sale, and what was the cost per pound?

324. A man disposed of his estate as follows: $\frac{1}{3}$ to his oldest son, $\frac{1}{3}$ of the remainder to each of two younger sons, and the residue of the estate to his wife. The estate realized \$54000; how should it be divided among the heirs, if the wife dies before the division, and her share is distributed according to the conditions of the will?

325. At what time between 4 and 5 o'clock are the hour and minute hands of a clock together? Opposite? At right angles? At an angle of 60°?

326. The frustum of a cone is 8 ft. high, the radii of its bases are 10 and $7\frac{1}{2}$ ft. respectively. What is the volume of the whole cone?

327. A jeweller wishes to mix gold of 12, 14, and 16 carats fine; how much of each should he take to produce 8 oz. of a mixture 15 carats fine?

328. Find the fourth root of 3 to three decimal places.

329. The last term of an arithmetical series is 120, the number of terms 15, and the common difference 5; what is the sum of the series?

330. \$200 at compound interest will amount to \$438.22462 in 20 years; what is the rate per cent.?

331. What is the value of a ground-rent of \$126.30 per annum, to commence after 15 years?

332. What is the amount of a monthly payment of \$10. compounded monthly for 12 years, at 6% per annum?

333. Change $\frac{1}{2\dot{9}}$ to a circulating decimal.

334. What price per meter is equal to \$7.25 per yard?

335. What is the 9th term of the series 64, 96, 144, 216, etc.?

336. Divide $1\frac{1}{8}$ times $.00\dot{1}$ by $.0\dot{3}$ times .7 of $\frac{5}{4}$.

337. What is the value of a draft on London for £111 18 s. 6 d., exchange at \$4.87 per pound sterling?

338. If 1 liter of wine costs .35 franc, at what price per gallon should it be sold to gain 25%?

339. What is the value of $100.75 in francs, at 5.15 francs to the dollar?

340. What is the 5th root of 5 to five decimal places?

341. Change 15 oz. Avoirdupois to milligrams.

342. How many centimeters in 7 rd. 4 yd. 2 ft. 9 in.?

343. Change to its simplest form $\frac{.06}{.\dot{3}} \div \frac{.\dot{3}}{.06}$.

344. 10% of a gram is what % of an ounce Troy?

345. What is the amount of a ground-rent of $950 which has remained unpaid for 7 years, compound interest at 5%?

346. What sum will pay off a ground-rent of $120 a year, payable semi-annually, interest at 4%?

347. What is the face of a sight draft which costs $1820.40, discount 1%?

348. Bought cloth at $5 per meter, and sold it at $5.50 per yard; what is my % of gain or loss?

349. How many pounds of coffee at 25 ct. a lb. must be mixed with 40 lb. of 30-ct. coffee so that the mixture may be worth 28 ct. a pound?

350. Find the sum of 10 terms of the series 4, 16, 64, 256, etc.

351. What is the value in U. S. money of a draft on London for £1000 18 s. 10d., exchange at $4.8665?

352. Added 10 lb. of 8-ct. sugar to some that was worth 12 ct.; how much was there of the latter, if the mixture is worth 11 cents per lb.?

353. The product of 5 equal factors is 161051; what is one of the factors?

354. Change .0̇0021̇5̇ to a common fraction.

355. Change 12 acres 50 sq. rd. 9 sq. yd. to hectares.

356. How many miles in 326.86 kilometers?

357. Change $\frac{7}{91}$ to a circulating decimal.

358. A grocer wishes to mix 50 lb. of sugar worth 10 cents per lb. with sugars worth 12 cents and 14 cents per lb., so as to form a mixture worth 13 cents a lb.; how much of each must he take?

359. The amount of a ground-rent which has not been paid for 20 years is $36785.591; what is the ground-rent, interest at 6%?

360. What is the probable duration of a building association whose money has been loaned at an average premium of 30% on 1000 shares, the whole number of shares being 1500?

361. How shall sugars worth 7, 8, 9, and 10 cents a pound be mixed, so that 100 lb. of the mixture shall be worth $8.50?

362. What is the value of 9.7 meters of silk at 3.37\frac{1}{2}$ per yard?

363. How many meters of carpeting, 90 centimeters in width, would cover the floor of a room 13 meters square?

364. Paris exchange is quoted at 518 centimes; what must I pay for a bill of exchange of 3000 francs, gold being at par?

365. In 50 lb. 12 oz. Avoirdupois how many kilograms?

366. The parallel sides of a trapezoid are 157.6 meters and 94 meters, and the perpendicular distance between them is 25 meters; what is the area?

367. Change 9 liters 3 deciliters to gallons quarts and pints.

368. How long would it require for a falling body to pass through the space of a mile, if it falls 16$\frac{1}{12}$ ft. the first second and 567$\frac{11}{12}$ ft. the last second?

369. The first term of a geometrical series is 5, the ratio is 5, and the number of terms 5; what is the sum of the series?

370. What is the present worth of an annuity of $1250 which is to continue for 12 years, interest compounded at 4%?

371. What is the value of 25000 marks of Germany in Danish crowns?

372. Mixed 30 bushels of wheat at \$1.25 with 60 bushels at \$1.15 and 75 bushels at \$1.10. How many bushels at \$1.30 must I add so that the mixture shall be worth \$1.20 per bushel?

373. Change $.0\dot{3}$ of a yard to the decimal of a foot.

374. How many bushels in 270.252 kiloliters?

375. At \$2.50 per are, what is the value of 125 acres?

376. In 600 lb. 10 oz. how many kilograms?

377. Divide 20.7 by 500, and subtract $\frac{1}{3}$ of $.0\dot{1}$ from the result.

378. If a man walk 60 kilometers a day, how many days would it take him to walk 250 miles?

379. Find the value of $\frac{3}{7}$ – two thousandths + $.000\dot{2}$.

380. Change £1776 14 s. $4\frac{1}{2}$ d. to United States money, exchange being at \$4.87$\frac{1}{4}$ per pound sterling.

381. What is the fifth root of .0005 to three decimal places?

382. When exchange is at \$4.89 per £ sterling, what will be the cost of a bill on Liverpool for £1800 18 s. $12\frac{1}{2}$ d.?

383. A vessel measures 3 feet square and 2 feet deep; how many liters will it hold?

384. How far does a body fall in 16 seconds, if it falls $16\frac{1}{12}$ ft. in the first second and gains $32\frac{1}{6}$ ft. each succeeding second?

385. Change $.1\dot{9}$, $.30\dot{3}$, $.\dot{7}0\dot{7}$, and $.22\dot{5}$ to common fractions.

386. What is the sum of the natural series of numbers 1, 2, 3, etc., to 200 inclusive?

387. Find the fifth root of 2 to four places of decimals.

388. Change $\frac{17}{9901}$ to a circulating decimal of 12 places.

389. What is the present worth of an annuity of \$925, in reversion 9 years and continuing 9 years, at 5%?

390. A cubical block of ice measures 5 decimeters on the edge; what is its weight in pounds?

391. The extremes of a series are $11\frac{3}{4}$ and 45, and the common difference is $4\frac{3}{4}$; what is the number of terms?

392. How many kiloliters in 5000 bushels?

393. What is the cost of a draft on St. Louis for $1864.72 at $1\frac{3}{8}\%$ discount?

394. The first term in a geometrical series is 9, the ratio is 9, and the number of terms 5; what is the sum of the series?

395. Bought cheese at $.15 per lb., and sold it at $.35 per kilogram; what is my gain %?

396. What is the value of $\frac{1}{3}$ of $.\dot{7}$ multiplied by $3.6 \div .\dot{1}$?

397. When exchange on London is $4.83, what is the face of a draft that I can purchase for $10000?

398. What is the ratio of 6.125 liters to 3 gal. 2 qt. 1 pt.?

399. What is the difference in Troy grains between 3 decigrams and 1 drachm Apothecaries' weight?

400. When exchange is 5.18 francs to the dollar, what is the face of a bill on Paris that costs $1500?

401. Change 12.5 kilograms to Troy weight.

402. If a meter is one forty-millionth of the circumference of the earth, what is the length of a degree in miles?

403. What amount should a member of a building association pay to make good 12 monthly payments of $10 each, interest compounded at 6%?

404. Change $.14\dot{1}4\dot{1}$ to a common fraction.

405. What is the ratio of $1\frac{1}{3}$ hectares to $3\frac{1}{2}$ acres?

406. What sum will pay a debt of $13798.64 in 4 equal annual installments, compound interest at 5%?

407. The ratio of an inch to a centimeter is 2.54; what is the ratio of a meter to a yard?

408. The ratio of 10 rods to a dekameter is 5.0291; what is the ratio of a mile to a kilometer?

409. What is the difference in 10 years between monthly payments of $10 each, and annual payments of $120, compounded at 6%?

410. Multiply $1.\dot{1}2\dot{1}$ by 1.121, and divide the product by $.1\dot{2}$.

411. What is the cube root of $\frac{128625}{352947}$?

412. In 18 mi. 20 rd. 3 yd., how many kilometers?

413. $\frac{1}{8}$ is what % of $.00\dot{2}$?

414. What is the diameter of a round log 30 feet in length, which when hewn square will make 45 cubic feet?

415. A merchant takes from his business each year $1000; each year his capital is increased by $\frac{1}{8}$ of the remainder; at the end of 3 years his capital has doubled; what had he at first?

416. Two companies of workmen receive $180 and $96, respectively; required the number in each company, knowing that each man of the first company receives one-half more than one of the second, and that the whole number in both is between 50 and 55.

417. A merchant buys cloth at 20 ct. per yard; he sells $\frac{1}{2}$ of it at 24 ct., $\frac{1}{8}$ at 20 ct., $\frac{1}{4}$ at 27 ct., and the remainder at 30 ct. per yard, and gains $\$27\frac{1}{2}$ on the whole; how many yards did he buy?

418. A merchant gains a sum equal to $\frac{2}{3}$ of his capital; the half of his gain multiplied by $\frac{1}{5}$ of his increased capital equals 4 times his gain; how much had he at first?

419. Three men work upon separate days at $2, $3, and $4 per day, respectively, 52 days in all, and earn equal sums of money; what number of days did each man work?

420. What is the cube root of $\frac{1}{3}$ to 10 places?

421. A merchant has a 90-day note for $1000, with interest at 6%, discounted at a Philadelphia bank on the fourth day after it was drawn. At maturity he reduces his indebtedness $200, and renews the note; what is the face of the new note?

422. If stock bought at 10% discount pays 5% on the investment, what % will it pay if it is purchased at 30% premium?

423. Paid $9733 for a bill of exchange on London for £2000; what was the rate of exchange if £9 were equal to $40?

424. A certain quantity of sugar is sold at 10 ct. per lb., which is a gain of $33\frac{1}{3}$ ct.; if the sugar were sold at $7\frac{1}{3}$ ct. per lb., the loss would be $1; how many pounds of sugar were sold?

425. What % will I gain by selling goods at cost, which were bought on 5 mo. credit, money being worth 10%?

426. Paid a debt in six annual instalments of $500 each; what was the debt, compound interest at 6%?

427. The sum of two numbers is 1460, and their difference is .2$\dot{7}$; what are the numbers?

428. 20% more than the selling price is 25% loss; what is the % of loss?

429. 20% less than the selling price is 25% gain; what is the gain %?

430. A debt of $4713.46 was paid in five equal annual instalments; what was the value of each payment, compound interest at 2%?

431. A merchant has a 60-day note discounted at a New York bank on the third day after it was drawn; what was the face of the note, if the proceeds were $5993, rate of discount 7%?

432. How many cubes whose sides are 4 in. each are equal in volume to a cube whose side is 1 ft.?

433. Bought 6% bonds at 104, kept them 4 years, when they were redeemed at par; what % did they yield me?

434. Borrowed $500 at 6% simple interest, and invested it in building association stock that paid $\frac{1}{2}$% a month compound interest; what do I gain in 9 years?

435. What is the present value of a pension of $100 a year, to commence after 9 years and continue for 10 years?

436. What is the difference between the bank discount of $2000 for 93 days at 6%, and the true discount for the same time and rate?

437. What length must be cut from the narrow end of a board to contain 1 sq. ft., the length of the board being 6 ft., and its width 12 in. at one end and 8 in. at the other?

438. An annuity of $1000 is left for 5 years to one person, then for 10 years to another, and afterward for 10 years to a third party; what is the present value of each person's use of the annuity?

439. Change $.\dot{7}$ of $.3\dot{3}$ of $.11\dot{1}$ to a common fraction.

440. A man pays me the interest on a note for $5000 at the expiration of 10 years. How much do I lose by not receiving the interest annually, reckoning compound interest at 6% on each year's interest for the time it was deferred?

441. What number is that to which if $.5\dot{5}$ of $\frac{3}{7}$ be added, the sum will be $.\dot{4}$?

442. Divide the $\sqrt{2}$ by the $\sqrt{4}$ to 5 places.

443. What is the inverse ratio of a franc to a pound sterling?

444. What is the duty on a kiloliter of wine, at 20% on the invoice price of 17 francs per gallon?

445. What is the total cost of goods purchased with the net proceeds of a sale, on which the commission merchant receives 5%, his commission for buying being 5%, the commissions being $500?

446. If the surface of a lake is 100 sq. mi., how many gallons of water will fall into it during a storm in which $\frac{1}{2}$ in. of rain has fallen?

447. $42.57 is $6\frac{1}{2}$% less than what sum?

448. What is the compound interest of $1870 for 19 years at 3%?

449. The present value of an annuity to be continued 10 years, at 6%, is $7360.087; what is the annuity?

450. What is the cost of 5 dekasteres of wood, at $7.25 per cord?

451. At what rate per cent. will the interest on $17.25 be equal to the principal in 41 years 8 months?

452. A carriage was sold for $80; if it had been sold for $100, the gain would have been $\frac{3}{4}$ of the loss at the former price; what was the original cost of the carriage?

453. I have 60 gallons of wine worth $3 per gallon; how many gallons of water must be added to reduce the price to $1.625 per gallon?

454. If 10 horses or 14 cows eat $5\frac{4}{5}$ tons of hay in 93 days, how long will 7 tons last 9 horses and 5 cows?

455. How many eagles, each weighing 258 grains, are equal in value to 500 English sovereigns, each weighing 123.274 grains, if the U. S. coins are $\frac{9}{10}$ pure gold, and the English $\frac{11}{12}$?

456. A merchant receives 70 barrels of sugar which cost him \$40 each; he sells the sugar at 12 cents per lb., and thus gains $16\frac{2}{3}\%$; what was the entire weight of the sugar?

457. Bought silk at \$5 per yard, and lose 5% on the measure; how much must it be sold at per yard that I may gain 20% and allow 5% for bad debts?

458. I sold some cloth at a loss of 3%, and an equal amount of cloth at a profit of 5%; the difference in the amount of the sales is \$32; what is the total amount of the sales, if the first cloth cost $\frac{3}{4}$ as much as the second?

459. Bought apples at the rate of 10 for 14 cents, and sold them at the rate of 28 for 40 cents, thus gaining \$3.25. How many did I sell?

460. The ratio of a cubic yard to a cubic meter is .7645; what is the ratio of a cubic meter to a perch of stone?

461. The ratio of 10 bushels to a hektoliter is 3.524; what is the ratio of a liter to a peck?

462. The ratio of a short ton to a tonneau is .9072; what is the ratio of 25 lb. to a kilogram?

463. If 60 gallons of wine contain 2 gallons of water, how many gallons of water must be added, so that 5 gallons of the mixture may contain 1 quart of water?

464. A circular piece of land 60 yards in diameter is to be divided into three equal parts by concentric circles. Required the radii of these circles in meters.

465. A clock which loses 10 seconds an hour is set to the correct time at $9\frac{1}{4}$ A. M. What will be the correct time when the hands are next together?

QUESTIONS

ON

ARITHMETIC AND MENSURATION.

PART II.

What is per cent.? Define base; rate; percentage. What sign is generally used instead of the words per cent.?

Define profit and loss; commission; brokerage. What is a broker? Define consignor; consignee; consignment.

What is a corporation? Define stock; shares. What is the meaning of face, nominal or par value? What is the meaning of market value? Define gross earnings; net earnings; dividend; assessment.

Define bonds. Name and define the different kinds of United States bonds. How are bonds named? Give an example. What is a coupon? How is a coupon used?

What are taxes? What is a poll or capitation tax? Define property tax. What is real estate? What is personal property?

What are duties or customs? Where are they collected? What is a port of entry? What is a custom-house? Define specific duty; ad valorem duty. What is an invoice? Define tare; leakage; breakage. What is gross weight? What is net weight?

Define insurance, and name the different kinds. What is a policy of insurance? Define premium.

What is interest? Define simple interest. What is compound interest? What is legal interest? Define usury; principal; rate; amount. What is the legal rate of interest in most of the States, and on debts due to the United States? What are partial payments?

What is a promissory note? What is the date of a note? What is the time of a note? Define maker or drawer; payee; indorser; indorsement. What is meant by the face of a note? Define negotiable note, and state how a note becomes negotiable. Is a bill or note valid

if not confined to a set form of words? What words are required by law in Pennsylvania? What words should be placed in a note for the protection of the payee? When do promissory notes begin to bear interest? Define present worth; true discount; commercial discount.

What is bank discount? How does it differ from true discount? What is a bank? What is meant by the proceeds of a note? What are days of grace? Define term of discount. When is a note at maturity? Define protest. When must a protest be made? What is its effect? Do the banks in the different States compute discount on a note for the same number of days?

Define ratio; arithmetical ratio; geometrical ratio. What are the terms of a ratio? Show how they may be written. Define antecedent; consequent; direct ratio; inverse ratio. What is a simple ratio? What is a compound ratio? Define proportion; simple proportion; compound proportion.

Define partnership; simple partnership; compound partnership. Define capital or stock. What is a firm?

Define equation of payments; equated time; term of credit. What is meant by averaging an account? Define cash balance.

Define analysis; involution; evolution; power; root; exponent. Of how many figures may a period consist, in extracting the square root? In extracting the cube root? How is a number prepared for the extraction of its square root? For the extraction of its cube root?

Define mensuration; straight line; curved line. Define perpendicular line; angle; acute angle; right angle; oblique angle. Define surface; plane; curved surface; area; volume. Define solid; plane figure; polygon; triangle. Name and define the different kinds of triangles. Define base, altitude, hypotenuse, perpendicular, as applied to triangles.

Define quadrilateral. Name and define the different kinds of quadrilaterals. Define diagonal; perimeter; altitude of a parallelogram.

Define circle; radius; diameter; circumference. When is a square said to be inscribed in a circle? What line of the inscribed square is the diameter of the circle?

Define prism; convex surface. What is a right prism? What is the whole surface of a prism or cylinder?

What are similar solids? Define pyramid; cone. Define altitude of a cone or pyramid; slant height; frustum. Define sphere; axis; radius and diameter of sphere.

What is gauging? What is a board foot? How is round timber usually estimated? How may hewn timber be estimated?

What are duodecimals? For what purpose are they used?

What is alligation? What is an arithmetical progression? What are the terms in an arithmetical progression? Define geometrical progression; extremes; means. Define ratio; increasing series; decreasing series; infinite series.

Define annuity; certain annuity; perpetuity. Define contingent annuity; annuity in arrears. Define annuity in reversion; amount; present worth.

What is a circulating decimal? Give an example. Are circulating decimals properly considered as decimals? Define repetend; pure circulating decimal. Define mixed circulating decimal. Give an example.

Define exchange; bill of exchange; foreign exchange. What is meant by inland or domestic exchange? What is a sight bill? A time bill? A draft? What is an acceptance, and how is it indicated?

What is the metric system? From what did it derive its name? What was the length of the meter intended to be? Is the length of the meter greater or less than originally intended? How are the higher denominations of any measure obtained? How are the lower denominations of any measure obtained?

What is the difference between the mode of computing true discount and that of computing banking discount? How do you simplify a complex fraction? What effect have ciphers on the value of decimals? Why? What is a surd root? What is the meaning of a fractional exponent? How may a quantity in Avoirdupois weight be changed to an equivalent quantity in Apothecaries' weight or Troy weight?

Upon what does the value of a fraction depend? When a note is discounted at a bank, does the bank receive interest at a greater or at a less rate if the note is to run a month, than if it is to run a year? Why? How is the value of a proper fraction affected by dividing it by a proper fraction? If the same number be added to both terms of a fraction, how is its value affected? Give the reason.

RULES AND TABLES.

PART II.

PERCENTAGE.

CASE I.

MULTIPLY the given number, or base, by the rate expressed decimally; the product will be the percentage.

CASE II.

Divide the percentage by the base, extending the division to hundredths.

CASE III.

Divide the percentage by the rate expressed as a decimal.

INTEREST.

CASE I.

Multiply the principal by the rate per cent. expressed decimally, and the product will be the interest for one year. If the time is in years and months, multiply this product by the time expressed in years and the fraction of a year. If the time is in years, months, and days, take $\frac{1}{12}$ of the year's interest, and multiply it by the time expressed in months and the fraction of a month.

NOTE.—Unless otherwise specified in the examples, 6% is to be taken as the rate, 30 days as a month, and 12 months as a year.

BUSINESS METHOD.

Multiply the principal by the number denoting the time in days, and divide the product by 6, pointing off three figures in the quotient when the principal is in dollars only, and five figures when there are cents in the principal.

NOTE.—For any other rate than 6%, multiply the interest at 6% by the given rate, and divide by 6.

CASE II.

Divide the given interest by the interest of one dollar for the given time and rate; or, divide the given amount by the amount of one dollar for the given time and rate.

CASE III.

Divide the given interest by the interest of the given principal for the given time at one per cent.

CASE IV.

Divide the given interest by the interest of the given principal at the given rate for one year.

COMPOUND INTEREST.

Find the amount of the given principal for the first period for which it is to be compounded, proceed with this amount as a new principal for the second period, and so on; the difference between the last amount and the given principal will be the compound interest.

PARTIAL PAYMENTS.

(UNITED STATES RULE.)

FIND the interest on the given principal from the date of the note to the date of the first payment, and if this payment equals or exceeds the interest, subtract it from the amount then due, and proceed in like manner with the remainder as a new principal.

If any payment is less than the interest due, find the in-

terest on the last principal to the date of the next payment, and so continue until the sum of the payments equals or exceeds the interest due; then subtract the sum of the payments from the amount due, and proceed as before.

(MERCANTILE RULE.)

Find the amount of the note or debt from the time it begins to draw interest, to the time of settlement; also the amount of each payment, from its date to the time of settlement.

Add the amounts of the payments together, and subtract their sum from the amount of the note or debt.

PRESENT WORTH AND DISCOUNT.

Divide the debt by the amount of one dollar for the given time and rate; the quotient will be the present worth.

Subtract the present worth from the debt, and the remainder will be the discount.

BANKING.

CASE I.

Find the interest on the face of the note for three days more than the time specified, and the result will be the bank discount.

Subtract the discount from the face of the note or sum discounted, and the remainder will be the proceeds.

NOTE.—In discounting notes the banks of Pennsylvania, Delaware, Maryland, Missouri, and Washington City charge interest for the day on which the notes are discounted and the day on which they mature. For example, a note drawn October 3, 1876, for 3 months, and discounted November 3, 1876, *matures* January 6, 1877, and the *term of discount* is from November 3 to January 6, both inclusive, or 65 days.

CASE II.

Divide the given proceeds by the proceeds of one dollar for the given time and rate; the quotient will be the face of the note.

PROPORTION.

SIMPLE.

EXPRESS the ratio of the terms which are of the same kind, as a proper fraction when the answer requires to be less than the remaining term, and as an improper fraction when the answer requires to be greater; multiply by the term which is of the same kind as the required answer, and the product will be the fourth term or answer.

COMPOUND.

Express the ratio of each pair of terms that are of the same kind, as a proper fraction when the answer, considered with reference to that pair, requires to be less than the term which is of the same kind as the answer, and as an improper fraction when the answer requires to be greater; and multiply the product of these fractions by the term which is of the same kind as the answer.

PARTNERSHIP.

SIMPLE.

MAKE the whole gain or loss the numerator, and the whole capital the denominator of a fraction; multiply this fraction by each partner's capital, for his share of the gain or loss.

COMPOUND.

Multiply each partner's capital by the time it is employed. Make the sum of all these products the denominator of a fraction, and the total gain or loss the numerator. Multiply this fraction by the product of each partner's capital by the time it is employed, and the result will be each partner's share of the gain or loss.

EQUATION OF PAYMENTS.

CASE I.

MULTIPLY each debt by the number denoting its term of credit, and divide the sum of the products by the number denoting the sum of the debts; the quotient will be the average term of credit. The average term of credit, added to the date of the debts, will give the equated time.

CASE II.

Multiply each payment by the number denoting the time it was paid before becoming due, and divide the sum of the products by the number denoting the balance unpaid; the quotient will be the time the balance should be kept after maturity.

CASE III.

Multiply each sum by the number denoting the difference in days between the date on which it becomes due, and the latest date on which any sum named in the account becomes due; divide the sum of the products by the sum of the debts, and the quotient will be the number of days to be counted backward from the latest date.

AVERAGING OF ACCOUNTS.

To find the *equated time*, multiply each item of debit or credit by the number which denotes the difference in days between the date on which it becomes due, and the latest date on which any item in the account becomes due.

Divide the difference between the sum of the debit and the sum of the credit products by the difference between the sum of the debits and the sum of the credits, and the quotient will be the number of days to be counted forward from the latest date when the larger sum of products is on the smaller side of the account, or backward when the larger sum of products is on the larger side of the account.

To obtain the *cash balance*, find the number of days between the date when each item is due and the date of settlement, and the interest on each item for its number of days. Add the interest to the item when it is due before the date of settlement, and subtract the interest from the item when it is due after that date. The difference between the two sides of the account, thus corrected, is the cash balance required.

INVOLUTION.

WRITE the given number as many times as a factor as there are units in the exponent, or number expressing the required power; the product of these factors will be the required power.

EVOLUTION.

SQUARE ROOT.

SEPARATE the given number into periods of two figures each, beginning at the right hand. Find the greatest number whose square is contained in the first left-hand period, for the first figure of the root. Subtract the square of this figure from the left-hand period, and to the remainder annex the next period for a dividend.

Double the root already found, for a trial divisor, and find how often it is contained in the dividend, excluding the right-hand figure. Write the quotient as the next figure of the root, annexing it also to the trial divisor as the units' figure of the complete divisor. Multiply the complete divisor by the figure of the root just found, and subtract the product from the dividend.

Double the root already found for a new trial divisor, and continue the operation as before, till all the periods have been used.

NOTE 1.—If any trial divisor is not contained in its dividend, annex a cipher to the root, a cipher to the trial divisor, and another period to the dividend, and proceed as before.

NOTE 2.—If there is a remainder after the root of a number has been extracted, annex periods of ciphers, and find the root to any required number of decimal places.

NOTE 3.—In fractions, extract the square root of the numerator and of the denominator separately, or change the fraction to a decimal and then extract the root.

CUBE ROOT.

Separate the given number into periods of three figures each, beginning at the right hand.

Find the greatest number whose cube is contained in the first left-hand period, for the first figure of the root. Subtract the cube of this figure from the left-hand period, and to the remainder annex the next period for a dividend.

For a trial divisor, annex one cipher to the figure of the root just found, square the number thus formed, and multiply it by 3, find how often it is contained in the new dividend, and the quotient will be the second figure of the root.

To the trial divisor add 3 times the product of the first figure of the root with a cipher annexed, by the quotient figure just found, and to the result add the square of the figure last found; the sum will be the complete divisor.

Multiply the complete divisor by the second figure of the root, and subtract the product from the dividend.

If there are any more periods to be brought down, annex the next period to the last remainder, and for a trial divisor annex a cipher to the figures of the root, square the number thus formed, multiply it by 3, and proceed as before.

NOTE 1.—If the trial divisor is not contained in the dividend, write a cipher in the root, annex two ciphers to the trial divisor, and bring down the next period for a new dividend.

NOTE 2.—If there should be a remainder after all the periods have been brought down, annex periods of ciphers, and find the root to any required number of decimal places.

NOTE 3.—If the given number contains a decimal, point off the periods to the right in the decimal, and, when any period is not complete, supply the deficiency with ciphers.

RULES IN MENSURATION.

SURFACES.

To find the area of a triangle.

FROM half the sum of the three sides, subtract each side separately; multiply the half sum and the three remainders together, and the square root of the product will be the area required.

NOTE.—When the base and altitude are given, the area is equal to the base multiplied by half the altitude.

To find the hypotenuse of a right triangle.

Extract the square root of the sum of the squares of the base and perpendicular.

To find the base or perpendicular.

Extract the square root of the difference between the square of the hypotenuse and the square of the given side.

To find the area of a parallelogram.

Multiply the base by the altitude.

To find the area of a trapezoid.

Multiply half the sum of the parallel sides by the altitude.

To find the area of a trapezium.

Divide the trapezium into two triangles by a diagonal line; the sum of the areas of these triangles will be the area of the trapezium.

To find the circumference of a circle, the diameter being given.

Multiply the diameter by 3.1416.

To find the diameter when the circumference is given.

Divide the circumference by 3.1416.

To find the area of a circle, the diameter or the circumference being given.

Multiply the square of the diameter by .7854; or, the square of the circumference by .07958.

To find the diameter or the circumference of a circle, the area being given.

Divide the area by .7854, and the square root of the quotient will be the diameter; or, divide the area by .07958, and the square root of the quotient will be the circumference.

To find the side of an inscribed square, the diameter or the circumference of the circle being known.

NOTE.—A square is *inscribed* in a circle when its diagonal is one of the diameters of the circle. The circle is then said to be *circumscribed* about the square.

Multiply the given diameter by .7071; or, the given circumference by .22507.

SOLIDS.

To find the surface of a prism or cylinder.

MULTIPLY the perimeter of the base by the altitude for the convex surface, and to the product add the areas of the two ends.

To find the volume or contents of any prism or cylinder.

Multiply the area of the base by the altitude.

To find the surface of a pyramid or cone.

Multiply the perimeter, or the circumference of the base, by half the slant height for the convex surface, and to the product add the area of the base.

To find the volume or contents of a pyramid or cone.

Multiply the area of the base by one-third the altitude.

To find the surface of the frustum of a pyramid or cone.

Multiply the sum of the perimeters or of the circumferences of the two ends by half the slant height, for the convex surface; and add the areas of the two ends when the whole surface is required.

To find the volume of the frustum of a pyramid or cone.

To four times the area of a middle section add the areas of the ends, and multiply by one-sixth the altitude.

To find the surface of a sphere.

Multiply the diameter by the circumference.

To find the volume of a sphere.

Multiply the cube of the diameter by .5236.

GAUGING.

To find the mean diameter of a cask.

Add to the head diameter .5, .55, .6, .65, or .7 of the difference between the bung and head diameters, according to the curvature of the cask. Thus, if the difference of the diameters is but 1 or 2 inches, add .5 of the difference; if the difference is 3 or 4 inches, add .55, and so on.

To find the contents of a cask in gallons.

Multiply the square of the mean diameter in inches by the length in inches, and this product by .0034.

BOARD MEASURE.

To find the contents of sawed or of hewn timber.

Write the multiplier under the multiplicand so that units of the same order shall stand in the same column.

Multiply as in compound numbers, carrying a unit for every twelve from each lower to the next higher denomination.

To find the contents of round timber.

To four times the area of a middle section add the areas of the ends, and multiply by one-sixth the length. Four-fifths of the contents will be the equivalent value of hewn timber.

NOTE.—To find the middle dimension, take half the sum of the dimensions at the ends.

BRICK-WORK.

To estimate the number of bricks in a wall.

To each of the dimensions of a brick add the thickness of the mortar in which it is laid, and find the contents in cubic inches. Divide the contents of the wall in cubic inches by the contents thus found, and the quotient will be the number of bricks required.

NOTE.—When a wall is said to be a certain number of bricks in thickness, to obtain the thickness add to the width of a brick the thickness of the mortar, and multiply by the number denoting the thickness.

HAY.

To estimate the weight of hay in a mow or stack.

For hay in the mow, multiply the contents in cubic feet by 4 for clover, or by 5 for timothy. In a well-settled stack, multiply the contents by 7 for clover, or by 9 for timothy hay, and the product will be the weight in pounds.

COAL.

To estimate the weight of coal in any given space.

Multiply the contents in cubic feet by 54 for anthracite, or by 50 for bituminous coal, and the product will be the weight in pounds.

RULES IN HIGHER ARITHMETIC.

ALLIGATION.

To find the average price of a mixture, the quantity and cost of each article being given.

FIND the total value of all the articles, and divide by the number which denotes the sum of the articles.

To find the quantity to be used of each article, when the average cost and the cost of each article are given.

Write the average cost by itself, and the cost of each article in a column on the right. Link each value that is less than the average cost with one that is greater. Place the difference between a less value and the average cost, opposite the greater value with which such less value is linked; and the difference between a greater value and the average cost, opposite the less value with which it is linked. If there is only one difference opposite to any value, it will be the required quantity of the article of that value; but if there should be two or more differences, their sum will express the required quantity.

When one of the articles is limited in quantity.

Find the proportional quantities of each article by Case II. Divide the given quantity by the proportional quantity of that article, and multiply the remaining proportional quantities by the quotient.

When two or more of the articles are limited in quantity.

Find the average value of articles that are limited in quantity, by Case I; the proportional quantities required, by Case II; and the amount of each article not limited in quantity, by Case III.

When the whole compound is limited to a particular quantity.

Find the proportional quantities by Case II, and divide the given quantity by their sum. Multiply each of the proportional quantities by the quotient thus obtained, and the products will be the required quantities.

HORNER'S METHOD OF EVOLUTION.

PREPARE as many columns as there are units in the index of the required root, placing the given number at the top of the first right-hand column, and a cipher at the head of each of the others.

Separate the given number into periods of as many figures each as there are units in the index of the required root, and find by trial the first figure of the root.

Add the figure thus found to the cipher at the head of the first left-hand column, multiply the sum by the root figure, and add the product to the cipher at the head of the second column. Proceed in a similar manner until the last product falls under the first left-hand period of the given number. Subtract this product from this first left-hand period, and to the remainder annex the next period for a new dividend.

Add the figure of the root just found to the amount in the first column, multiply the sum by the same figure, adding the product to the next column, and so continue till the last product falls in the last column but one.

Proceed in a similar manner, stopping each time one column farther to the left, until the last operation is the addition of the first figure of the root to the sum in the first left-hand column.

Annex one cipher to the number at the foot of the first column, two ciphers to the number at the foot of the second column, and so on.

Consider the number standing in the column next to the last as the trial divisor; find how often it is contained in the dividend, and write the quotient as the second figure of the root.

Add this figure to the amount in the first column, multiply the sum by the same figure, and proceed as before, till the last product falls under the trial divisor. The sum of the last product and the trial divisor will be the complete divisor. Multiply by the figure of the root just found, subtract the product from the dividend, and proceed as before till all the periods have been brought down.

NOTE 1.—When any dividend will not contain the trial divisor, place a cipher in the root, bring down the next period, annex one cipher to the number in the first column, two ciphers to the number in the second column, and so on, using the trial divisor with the proper number of ciphers annexed as a new trial divisor.

NOTE 2.—When the exact root cannot be extracted, periods of ciphers may be annexed, and the work extended to any required number of decimal places.

ARITHMETICAL PROGRESSION.

One of the extremes, the common difference, and the number of terms being given, to find the other extreme.

To the less extreme add the product of the common difference by the number of terms less one; or, subtract this product from the greater extreme; the result in either case will be the other extreme.

To find the common difference, when the extremes and the number of terms are given.

Divide the difference between the extremes by the number of terms less one.

To find the number of terms, when the extremes and the common difference are given.

Divide the difference between the extremes by the common difference, and add 1 to the quotient.

To find the sum of the series, when the extremes and the number of terms are given.

Multiply the sum of the extremes by the number of terms, and divide the product by two.

GEOMETRICAL PROGRESSION.

One of the extremes, the ratio, and the number of terms being given, to find the other extreme.

MULTIPLY the first term by that power of the ratio whose index is one less than the number of terms, and the product will be the last term; or, divide the last term by the same power of the ratio, and the quotient will be the first term.

To find the ratio, when the extremes and the number of terms are given.

Divide the last term by the first, and extract that root of the quotient whose index is one less than the number of terms.

To find the number of terms, when the ratio and the extremes are given.

Divide the last term by the first, raise the ratio to a power equal to this quotient, and add one to the index of that power for the number of terms.

To find the sum of the series, when the ratio and the extremes are given.

Multiply the last term by the ratio, and divide the difference between this product and the first term by the difference between the ratio and one.

ANNUITIES.

To find the amount of an annuity.

MULTIPLY the amount of $1 for the given time, as found in the table, by the number denoting the annuity, and the product will be the required amount.

To find the present worth of an annuity.

Multiply the present worth of an annuity of $1 for the given time, as found in the table, by the number denoting the annuity, and the product will be the required present worth.

To find the value of a perpetuity.

Divide the given annuity by the number denoting the rate of interest, expressed decimally.

To find the annuity, the present worth, or the amount, the time and the rate being given.

Divide the given present worth by the present worth of $1, or the given amount by the amount of $1 for the given time and rate, and the quotient will be the required annuity.

To find the value of an annuity in reversion.

Find the present worth of an annuity of $1 for the full time, also for the time during which payment is deferred; the difference of these present worths multiplied by the number which denotes the annuity will be the value of the reversion.

BUILDING ASSOCIATIONS.

To estimate the probable duration of a series of stock, the value of a share being $200.

MAKE the number of shares on which money has been loaned the numerator of a fraction, and the total number of shares the denominator. Multiply this fraction by twice the number which denotes the average premium, and subtract the product from the final value of a share ($200). Find the time in which a monthly payment of $1 will amount to the sum thus obtained, and the number of months most nearly corresponding will be the probable duration of the series.

CIRCULATING DECIMALS.

REDUCTION.

If the circulating decimal is pure, omit the decimal point, make the repetend the numerator, and take as many nines for the denominator as there are figures in the repetend.

If the circulating decimal is mixed, change it to an equivalent mixed decimal, and simplify the resulting fraction.

Operations in the fundamental rules.

Change circulating decimals to common fractions, perform the required operations, and reduce the result to an equivalent decimal.

CURRENCIES.

To change foreign currency to U. S. money, or U. S. money to foreign currency, multiply or divide, as the case may require, by the value in U. S. money of a unit of the given currency.

INLAND OR DOMESTIC EXCHANGE.

To find the cost of a draft.

Multiply the cost of $1 by the amount of the draft.

To find the face of a draft.

Divide the given cost by the cost of $1.

FOREIGN EXCHANGE.

To find the cost of a bill on England.

Multiply the market value of £1 by the amount named in the bill.

To find the face of a bill on England.

Divide the value in gold of the given amount by the market value of £1.

TABLES

OF

WEIGHTS AND MEASURES.

United States Money.

10 mills . . . . . = 1 cent.
10 cents . . . . . = 1 dime.
10 dimes . . . . . = 1 dollar.
10 dollars . . . . . = 1 eagle.

English Money.

4 farthings . . . = 1 penny.
12 pence . . . . = 1 shilling.
20 shillings . . . = 1 pound *or* sovereign.
21 shillings . . . = 1 guinea.

Avoirdupois Weight.

16 ounces . . . = 1 pound.
100 pounds . . = 1 hundredw't.
20 hundredw't, *or* 2000 lbs. = 1 *short* ton.
28 pounds . . . = 1 quarter.
4 quarters, *or* 112 lbs. = 1 hundredw't.
20 hundredw't, *or* 2240 lbs. = 1 *long* ton.

NOTE.—The *long* or *gross* ton is principally used in estimating the weight of goods at custom-houses, and in weighing coal and iron.

Troy Weight.

24 grains . . . = 1 pennyweight.
20 pennyweights = 1 ounce.
12 ounces . . . = 1 pound.

Dry Measure.

2 pints . . . . . = 1 quart.
8 quarts . . . . . = 1 peck.
4 pecks . . . . . = 1 bushel.
2150.42 cu. inches. . . = 1 bushel.

Liquid Measure.

4 gills . . . . . = 1 pint.
2 pints . . . . . = 1 quart.
4 quarts . . . . = 1 gallon.
31½ gallons . . . = 1 barrel.
2 barrels, *or* 63 gallons . = 1 hogshead.
231 cu. in. = 1 standard liquid gal.

Long Measure.

12 inches . . . . . = 1 foot.
3 feet . . . . . = 1 yard.
5½ yards . . . . . = 1 rod.
320 rods . . . . . = 1 mile.
4 inches . . . . . = 1 hand.

Square Measure.

144 square inches = 1 square foot.
9 square feet . = 1 square yard.
30¼ square yards = 1 square rod.
160 square rods = 1 acre.
640 acres . . . = 1 square mile *or* 1 section of government land.
36 square miles . = 1 township.

Apothecaries' Weight.

20 grains . . . = 1 scruple (℈).
3 scruples . . = 1 drachm (ʒ).
8 drachms . . = 1 ounce (℥).
12 ounces . . . = 1 pound (℔).

Apothecaries' Liquid Measure.

60 minims *or* drops = 1 fluid drachm.
8 fluid drachms . = 1 fluid ounce.
16 fluid ounces . = 1 pint.
8 pints . . . . = 1 gallon.

Cubic Measure.

1728 cubic inches = 1 cubic foot.
27 cubic feet . . = 1 cubic yard.
40 feet of round *or* 50 feet of hewn timber = 1 ton.
16 cubic feet . . = 1 cord foot.
8 cord feet, *or* 128 cubic feet = 1 cord of wood.
24¾ cubic feet . = 1 perch of stone.

Measure of Time.

60 seconds . . . . = 1 minute.
60 minutes . . . . = 1 hour.
24 hours . . . . = 1 day.
7 days . . . . . = 1 week.
12 calendar months, *or* 365 days = 1 year.
366 days . . . . = 1 leap year.
100 years . . . . = 1 century.

Mariners' Measure.

6 feet . . . . = 1 fathom.
1.16 miles (nearly) = 1 geog. mile *or* knot.
3 geographic *or* nautical miles = 1 league.
60 geographic, *or* 69⅛ statute miles = 1 degree.
360 degrees = 1 circumference of the earth.

Surveyors' Linear Measure.

7.92 inches . . . . = 1 link.
25 links . . . . . = 1 rod.
4 rods, *or* 66 feet . . . = 1 chain.
80 chains . . . . . = 1 mile.

Surveyors' Square Measure.

625 square links = 1 pole.
16 poles . . . = 1 square chain.
10 square chains = 1 acre.

Board Measure.

12 thirds (‴) = 1 second (1″).
12 seconds = 1 inch *or* prime (1′).
12 inches *or* primes = 1 foot (1 ft.)

Circular Measure.

60 seconds . . . = 1 minute.
60 minutes . . . = 1 degree.
30 degrees . . . = 1 sign.
12 signs, *or* 360 degrees = 1 circumference.
90 degrees . . . = 1 quadrant.
60 degrees . . . = 1 sextant.

Longitude and Time.

15° of longitude = a difference of 1 hour in time.
15′ of longitude = a difference of 1 minute in time.
15″ of longitude = a difference of 1 second in time.

Miscellaneous Table.

12 units . . . . . = 1 dozen.
12 dozen . . . . . = 1 gross.
20 units . . . . . = 1 score.
24 sheets . . . . . = 1 quire.
20 quires . . . . . = 1 ream.
2 reams . . . . . = 1 bundle.
5 bundles . . . . . = 1 bale
1 pound, Troy *or* Apothecaries' weight = 5760 grains.
1 pound, Avoirdupois weight = 7000 grains.
196 pounds . . . = 1 barrel flour.
200 pounds . . . = 1 barrel fish.
200 pounds beef *or* pork = 1 barrel.
100 pounds grain *or* flour = 1 cental.
100 pounds dried fish = 1 quintal

METRIC SYSTEM.

Measures of Length.

The unit of length is the **Meter.**

10 Millimeters (mm.)	= 1 Centimeter (cm.)	= .3937079 inches.
10 Centimeters	= 1 Decimeter (dm.)	= 3.937079 "
10 Decimeters	= 1 **METER** (m.)	= 39.37079 "
10 Meters	= 1 Dekameter (Dm.)	= 393.7079 "
10 Dekameters	= 1 Hektometer (Hm.)	= 3937.079 "
10 Hektometers	= 1 Kilometer (Km.)	= 39370.79 "
10 Kilometers	= 1 Myriameter (Mm.)	= 393707.9 "

Measures of Surface.

The unit for measuring ordinary surfaces is the **Square Meter**; for measuring land, the **Are** or square dekameter.

100 Sq. Millimeters (sq. mm.)	= 1 Sq. Centimeter (sq. cm.)	= .155 sq. in.
100 Sq. Centimeters	= 1 Sq. Decimeter (sq. dm.)	= 15.5 "
100 Sq. Decimeters	= 1 **SQ. METER** (sq. m.)	= 1550 "
100 Centiares (ca.) (sq. meters)	= 1 **ARE** (a.)	= 119.6 sq. yd.
100 Ares	= 1 Hektare (Ha.)	= 2.471 acres.

Measures of Capacity.

The unit of wood measure is the **Stere**; it is equal to the **Cubic Meter**, the unit for other measurements of solids.

1000 Cu. Millimeters (cu.mm.)	= 1 Cu. Centimeter (cu.cm.)	= .061 cu. in.
1000 Cu. Centimeters	= 1 Cu. Decimeter (cu.dm.)	= 61.027 "
1000 Cu. Decimeters	= 1 **CU. METER** (cu. m.)	= 35.316 cu. ft.
10 Decisteres (ds.)	= 1 **STERE** (s.) (cu. meter)	= 35.316 cu. ft.
10 Steres	= 1 Dekastere (Ds.)	= 13.080 cu. yd.

The unit of dry measure and of liquid measure is the **Liter,** which is equal to a cubic decimeter.

		DRY MEASURE.	LIQUID MEASURE.
10 Milliliters (ml.)	= 1 Centiliter (cl.)	= 0.6102 cu. in.	or 0.338 fluid oz.
10 Centiliters	= 1 Deciliter (dl.)	= 6.1022 "	" 0.845 gi.
10 Deciliters	= 1 **LITER** (l.)	= 0.908 qt.	" 1.0567 qt.
10 Liters	= 1 Dekaliter (Dl.)	= 9.08 "	" 2.6417 gal.
10 Dekaliters	= 1 Hektoliter (Hl.)	= 2.8375 bu.	" 26.417 "
10 Hektoliters	= 1 Kiloliter (Kl.)	= 28.375 "	" 264.17 "
10 Kiloliters	= 1 Myrialiter (Ml.)	= 283.75 "	" 2641.7 "

Measures of Weight.

The unit of weight is the **Gram.**

10 Milligrams (mg.)	= 1 Centigram (cg.)	= 0.1543	grains.
10 Centigrams	= 1 Decigram (dg.)	= 1.5432	"
10 Decigrams	= 1 GRAM (g.)	= 15.432	"
10 Grams	= 1 Dekagram (Dg.)	= 0 3527	oz. Avoir.
10 Dekagrams	= 1 Hektogram (Hg.)	= 3.5273	" "
10 Hektograms	= 1 Kilogram (Kg.)	= 2.2046	lb. "
10 Kilograms	= 1 Myriagram (Mg.)	= 22.046	" "
10 Myriagrams	= 1 Quintal (Q.)	= 220.46	" "
10 Quintals	= 1 Tonneau (T.)	= 2204.6	" "

Table showing the weight in pounds of a cubic foot of each substance named therein.

SUBSTANCE.	WEIGHT.	SUBSTANCE.	WEIGHT.
Alcohol, pure	49½ lb.	Lead	711 lb.
" common	52	Lignum-vitæ	83
Ale	65	Limestone	197
Alum	107	Lime, quick	50
Anthracite coal, solid	93	Linseed oil	58¾
" " broken	54	Manganese	500
Bituminous coal, solid	80	Maple	47
" " broken	50	Marble	168
Brick, pressed	150	Mercury	849
" common hard	125	Milk	64½
" " soft	100	Nitre	119
Butter	59	Poplar	24
Cedar	35	Quartz	165
Cherry	44	Salt	133
Clay	125	Saltpetre	131
Copper	547	Sand, dry	94
Cork	15	" moist	112
Earth, solid	124	" wet	130
" loose	92	Silver	655
Glass, green	165	Slate, average weight	175
Gold	1204	Steel, hard	489
Granite	166	Tin	456
Gravel	120	Turpentine, spirits of	54
Ice	58	Vinegar	65½
Iron, cast	450	Walnut	42
" wrought	480	Water	62½
Lard	59	Wine, Burgundy	62

The amount of $1 compounded monthly, at 6% per annum; also the amount of a monthly payment of $1, compounded in the same manner.

MO.	AMOUNT OF $1.	MONTHLY PAYMENTS OF $1.	MO.	AMOUNT OF $1.	MONTHLY PAYMENTS OF $1.
1	$1.00500	$1.000	36	$1.19668	$39.336
2	1.01002	2.005	48	1.27049	54.098
3	1.01507	3.015	60	1.34885	69.771
4	1.02015	4.030	72	1.43205	86.410
5	1.02525	5.050	84	1.52038	104.076
6	1.03037	6.075	90	1.56656	113.313
7	1.03553	7.106	96	1.61415	122.831
8	1.04070	8.141	102	1.66319	132.638
9	1.04591	9.182	108	1.71371	142.743
10	1.05114	10.228	114	1.76577	153.155
11	1.05640	11.279	120	1.81941	163.883
12	1.06167	12.335	126	1.87468	174.937
18	1.09393	18.786	132	1.93163	186.327
24	1.12716	25.432	138	1.99031	198.063
30	1.16140	32.280	144	2.05073	210.146

The amount of an annuity of $1 for any number of years from 1 to 25.

YR.	2%	3%	4%	5%	6%
1	$1.000000	$1.000000	$1.000000	$1.000000	$1.000000
2	2.020000	2.030000	2.040000	2.050000	2.060000
3	3.060400	3.090900	3.121600	3.152500	3.183600
4	4.121608	4.183627	4.246464	4.310125	4.374616
5	5.204040	5.309136	5.416323	5.525631	5.637093
6	6.308121	6.468410	6.632975	6.801913	6.975319
7	7.434283	7.662462	7.898294	8.142008	8.393838
8	8.582969	8.892336	9.214226	9.549109	9.897468
9	9.754628	10.159106	10.582795	11.026564	11.491316
10	10.949721	11.463879	12.006107	12.577893	13.180795
11	12.168715	12.807796	13.486351	14.206787	14.971643
12	13.412090	14.192030	15.025805	15.917127	16.869941
13	14.680332	15.617790	16.626838	17.712983	18.882138
14	15.973938	17.086324	18.291911	19.598632	21.015066
15	17.293417	18.598914	20.023588	21.578564	23.275970
16	18.639285	20.156881	21.824531	23.657492	25.672528
17	20.012071	21.761588	23.697512	25.840366	28.212880
18	21.412312	23.414435	25.645413	28.132385	30.905653
19	22.840559	25.116868	27.671229	30.539004	33.759992
20	24.297370	26.870374	29.778079	33.065954	36.785591
21	25.783317	28.676486	31.969202	35.719252	39.992727
22	27.298984	30.536780	34.247970	38.505214	43.392290
23	28.844963	32.452884	36.617889	41.430475	46.995828
24	30.421862	34.426470	39.082604	44.501999	50.815577
25	32.030300	36.459264	41.645908	47.727099	54.864512

The present worth of an annuity of $1 for any number of years from 1 to 25.

YR.	2%	3%	4%	5%	6%
1	$ .980392	$ .970874	$ .961538	$ .952381	$ .943396
2	1.941561	1.913470	1.886095	1.859410	1.833393
3	2.883883	2.828611	2.775091	2.723248	2.673012
4	3.807729	3.717098	3.629895	3.545951	3.465106
5	4.713460	4.579707	4.451822	4.329477	4.212364
6	5.601431	5.417191	5.242137	5.075692	4.917324
7	6.471991	6.230283	6.002055	5.786373	5.582381
8	7.325481	7.019692	6.732745	6.463213	6.209794
9	8.162237	7.786109	7.435332	7.107822	6.801692
10	8.982585	8.530203	8.110896	7.721735	7.360087
11	9.786848	9.252624	8.760477	8.306414	7.886875
12	10.575341	9.954004	9.385074	8.863252	8.383844
13	11.348374	10.634955	9.985648	9.393573	8.852683
14	12.106249	11.296073	10.563123	9.898641	9.294984
15	12.849264	11.937935	11.118387	10.379658	9.712249
16	13.577709	12.561102	11.652296	10.837770	10.105895
17	14.291872	13.166118	12.165669	11.274066	10.477260
18	14.992031	13.753513	12.659297	11.689587	10.827603
19	15.678462	14.323799	13.133939	12.085321	11.158116
20	16.351433	14.877475	13.590326	12.462210	11.469921
21	17.012269	15.415024	14.029160	12.821153	11.764077
22	17.658048	15.936917	14.451115	13.163003	12.041582
23	18.292204	16.443608	14.856842	13.488574	12.303379
24	18.913926	16.935542	15.246963	13.798642	12.550358
25	19.523456	17.413148	15.622080	14.093945	12.783356

Table of Foreign Currencies.

COUNTRY.	COIN.	VALUE.	COUNTRY.	COIN.	VALUE.
Brazil	Milreis	$ .545	Great Britain	Pound	$4.866½
Chili	Peso	.912	Italy	Lira	.193
Cuba	"	.926	Japan	Yen	.997
Denmark	Crown	.268	Spain	Peseta	.193
France*	Franc	.193	Sweden	Crown	.268
German Empire	Mark	.238	Switzerland	Franc	.193

* A franc = 100 centimes. A sou = 5 centimes. A napoleon = 20 francs.

Table showing the number of pounds in a bushel.

SUBSTANCE.	WEIGHT.	SUBSTANCE.	WEIGHT.
Barley	48 lb.	Oats	32 lb.
Clover seed *or* wheat	60	Peas *or* potatoes	60
Coal, heaped bushel	80	Rye	56
Corn	56	Timothy seed	45

Table to find the number of days from any day of one month to any day of another month in the same year.

From any day of	To the same day of											
	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
January	365	31	59	90	120	151	181	212	243	273	304	334
February . . .	334	365	28	59	89	120	150	181	212	242	273	303
March	306	337	365	31	61	92	122	153	184	214	245	275
April	275	306	334	365	30	61	91	122	153	183	214	244
May	245	276	304	335	365	31	61	92	123	153	184	214
June	214	245	273	304	334	365	30	61	92	122	153	183
July	184	215	243	274	304	335	365	31	62	92	123	153
August	153	184	212	243	273	304	334	365	31	61	92	122
September . . .	122	153	181	212	242	273	303	334	365	30	61	91
October	92	123	151	182	212	243	273	304	335	365	31	61
November . . .	61	92	120	151	181	212	242	273	304	334	365	30
December . . .	31	62	90	121	151	182	212	243	274	304	335	365

How to use the Table.—If we wish to find the number of days from Apr. 4 to Oct. 22, at the intersection of April in the vertical column and October in the horizontal column we find 183 days; then we add the difference between the 4th and 22d, or 18 days, which gives 201 days, the number required. To find the number of days from Apr. 22 to Oct. 4, we subtract the 18 from the 183.

Table of Abbreviations.

@,	At.	*Fr't*,	Freight.
%,	Account.	*F'w'd*,	Forward.
Am't,	Amount.	*Inst.*,	The present month.
Bal.,	Balance.	*Int.*,	Interest.
B/L,	Bill of lading.	*Mdse.*,	Merchandise.
Co.,	Company.	*No.*,	Number.
C. O. D.,	Cash on delivery.	*Pay't*,	Payment.
Cr.,	Creditor.	*Pd.*,	Paid.
Dft.,	Draft.	*Per cent.*, %,	By the hundred.
Disc't,	Discount.	*P. O. O.*,	Post-office order.
Do. (*ditto*),	The same.	*Prem.*,	Premium.
Dr.,	Debtor.	*Prox.*,	The next month.
E. E.,	Errors excepted.	*Rec'd*,	Received.
Exch.,	Exchange.	*Ult.*,	The last month.
Exps.,	Expenses.	*Wt.*,	Weight.

Answers to Graded Problems.

PART II.

Page 5.

1. \$70.035.
2. \$101.304.
3. \$330.0206$\frac{1}{4}$.
4. 62.54875.
5. 13732.75.
6. 237.25 lb.
7. 67.575 T.
8. 2400 horses.
9. 2 sheep.
10. 600 men.
11. 14.90$\frac{2}{3}$ oz.
12. 1.845 T.
13. £5 12 s. 11 d. .97 far.
14. \$937.50.
15. \$35.15625.
16. \$962.5595.
17. .03$\frac{1}{3}$.
18. 216 min.
19. 100000 bricks.
20. 3 ft. 11.95 in.
21. 6 lb. 5 oz. 18 pwt. 22.8 gr.

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22. 213$\frac{1}{3}$%.
23. 46$\frac{7}{8}$%.
24. 10$\frac{5}{12}$%.
25. 1$\frac{1}{24}$%.
26. 3080$\frac{10}{13}$%.
27. 2$\frac{3544}{4813}$%.
28. 153$\frac{199}{217}$%.
29. 1$\frac{1}{240}$%.
30. 7$\frac{35}{64}$%.
31. 2$\frac{1}{2}$%.
32. 15%.
33. 12$\frac{37}{49}$%.
34. 13$\frac{47}{216}$%.
35. 10$\frac{331}{2640}$%.
36. 91$\frac{403}{607}$%.
37. 9$\frac{4}{5}$%.
38. 12$\frac{1}{2}$%.
39. 150%.
40. 5$\frac{5}{6}$%.
41. 19$\frac{7}{12}$%.
42. 16$\frac{108}{287}$%.
43. 30%.
44. $\frac{91}{280}$%.
45. 5$\frac{1}{10}$%.
46. 26$\frac{2}{3}$%.
47. $\frac{1300}{1809}$%.
48. 9$\frac{3}{7}$%.

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49. 702.
50. 14$\frac{86}{351}$.
51. \$127.27$\frac{3}{11}$.
52. 1901$\frac{89}{111}$ yd.
53. .1.
54. 200.
55. 6384 mi.
56. 38 bu. 3$\frac{5}{9}$ pk.
57. 89$\frac{9}{19}$%.
58. \$40000.
59. \$100000.
60. 25.
61. 93 mi.
62. \$6000.
63. 122$\frac{18}{31}$ bu.
64. 25%.
65. £63 7 d. 2 far.
66. 13$\frac{3}{9}$.
67. \$9.52$\frac{8}{21}$.
68. \$10.52$\frac{12}{19}$.
69. 500.
70. 250.
71. \$24000.
72. \$213$\frac{1}{3}$.
73. 50%.
74. Smith's, \$9009; Brown's, \$6006.

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75. \$10.
76. 27.325%.
77. 12$\frac{1}{2}$%.
78. 50$\frac{50}{51}$% gain. \$254.90 + gain on investment.
79. 54$\frac{122}{207}$%.
80. \$1095.47.
81. \$664.06$\frac{1}{4}$.
82. 40%.
83. \$1200; 7$\frac{11}{27}$%.
84. \$36.875.
85. \$87$\frac{1}{2}$%.

Page 9.

86. \$4666$\frac{2}{3}$.
87. \$279$\frac{59}{179}$.
88. \$576$\frac{12}{13}$.
89. \$420.
90. \$.75.
91. \$6250.
92. \$1093.75.
93. \$111$\frac{1}{9}$.
94. \$144.
95. 52$\frac{7}{9}$% gain.
96. \$5.25.
97. 6$\frac{1}{4}$% loss.
98. \$200.
99. 75% gain.
100. 16$\frac{2}{3}$% loss.
101. 6$\frac{1}{4}$% gain

Page 10.

102. 20%.
103. $26\frac{2}{3}\%$ loss.
104. $9\frac{1}{11}\%$.
105. 25%.
106. 25%.
107. $\$1.37\frac{1}{2}$.
108. 300%.
109. $32\frac{4}{61}\frac{4}{8}\%$.
110. $420.
111. 25%.
112. $73\frac{11}{18}\%$.
113. $18\frac{2}{11}\%$.
114. $1000.
115. 1% loss.

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116. $42.227+.
117. $231.25.
118. 5%.
119. £15 12 s.
10.78125 d.
120. $\$46.96\frac{7}{8}$.
121. $3\frac{5}{8}\%$.
122. $3.47+.
123. $3640.
124. $31.25.
125. $29.126+.
126. $54.147+.
127. $49.88.
128. $84.
129. $16600; $16683.
130. $19000.

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131. $2812.50.
132. $8\frac{4}{5}\%$.
133. $3571.875.
134. 30%.
135. $4\frac{2}{3}\frac{2}{3}\frac{8}{3}\%$.
136. $625; $2\frac{54}{2}\frac{4}{1}\frac{4}{5}\%$.
137. $\$102.18\frac{3}{4}$.
138. $10 a share.
139. $15000.
140. 78% discount.
141. 242% premium.
142. $2362.50.
143. $\$60.53\frac{3}{7}$ per share.
144. $10000.
145. 80 shares.

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146. $5964.28+.
147. $157.89+.
148. $4\frac{1}{8}\%$.
149. $\$10416.66\frac{2}{3}$.
150. $50000000.
151. $293.75.
152. $.003\frac{1}{1}\frac{5}{3}$.
153. $24870454.54+.
154. $9163802.97.
155. $\frac{1}{2}\%$.
156. $2\frac{1}{1}\frac{1}{2}\%$.
157. $2\frac{3}{3}\frac{7}{6}\frac{4}{2}\frac{6}{7}\%$.

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158. $5816.25.
159. $5089.28+gold.
160. $5256.
161. $6839.08.
162. 62176.16+francs.
163. 2561.9+ yards.
164. $1\frac{1}{2}\%$.
165. 25%.
166. $20000.
167. 24%.
168. $33\frac{1}{3}\%$.
169. $8040.
170. $\$3052.85\frac{5}{7}$.
171. $591.48.

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172. $311.50.
173. $100.75.
174. $5187.50.
175. $8640.
176. $24000.
177. $\frac{1}{3}\%$.
178. $22\frac{2}{5}$ years.
179. $3000.
180. $4\frac{3}{4}\%$.
181. $1\frac{1}{4}\%$.
182. $\$6451\frac{1}{1}\frac{8}{1}$.
183. $560.
184. $\$10256\frac{1}{3}\frac{6}{5}$.

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185. $226.575.
186. $202.53+.
187. $1208.48.
188. $517.068+.
189. $8.12.
190. $\$456.16\frac{2}{3}$.
191. $258.86+.
192. $527.10.
193. $324.67+.
194. $22.908+.
195. $173.75.
196. $837.59+.
197. $50.79+.
198. $115.47+.
199. $25.028+.
200. $2155.66+.
201. $60.46+.
202. $73.26+.
203. $15.646+.
204. $32.64+.
205. $8.25+.
206. $10.91+.
207. $106.29+.
208. $147.92+.
209. $2206.81.
210. $47.37+.
211. $91.48+.
212. $786.25.
213. $33.02+.
214. $45.85.

Page 17.

215. $36.34.
216. $48.875.
217. $13.016.
218. $26.29+.
219. $701.318+.
220. $14.197+.
221. $55.83.
222. $54.918+.
223. $25.888+.
224. $5.45+.
225. $\$142.66\frac{2}{3}$.
226. $27.55+.
227. $9.496.
228. $92.28+.
229. $796.44+.
230. $12.157+.
231. $28.18+.
232. $14.98+.
233. $5.549+.
234. $\$107.66\frac{2}{3}$.
235. $60.92+.
236. $30.89+.
237. $6.466+.
238. $19.267+.
239. $30.187+.
240. $293.

241. $38.497.
242. $77.158+.
243. $63.31+.
244. $68.34+.
245. $90.15+.

Page 18.

246. $4743.80+.
247. $9680.
248. $1010.
249. $14285.71⅞.
250. $140.62½.
251. $10200.
252. $7200.
253. $658.53+.
254. $3120.
255. $114.75.
256. 57617.30\frac{14}{19}$.
257. $981.996+.
258. $2804.39+.
259. $2311.11+.
260. $13955.51+.
261. $12656.25.
262. $50000.

Page 19.

263. 6%.
264. 12%.
265. 6%.
266. 6¼%.
267. 9%.
268. 10$\frac{46}{119}$%.
269. 30%.
270. 12%.
271. 5%.
272. 14%.
273. 3½%.
274. 4%.
275. 6%.
276. 12%.
277. 4½%.
278. 9%.
279. 2¼%.
280. 8⅓%.

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281. 4 yr. 1 mo. 10 da.
282. 4 yr. 8 mo. 15 da.
283. 3 yr. 4 mo. 15 da.
284. 1 yr. 1 mo. 1 da.
285. 8 yr. 10 mo. 18 da.
286. 8 yr. 6 mo. 25 da.
287. 2 yr. 11 mo. 27 da.
288. 11 mo. 3 da.
289. 17 yr. 208 da.
290. 6 yr. 1 mo. 2 da.
291. 16½ da.
292. 2 yr. 7 mo. 15 da.
293. 1 yr. 4 mo. 24 da.
294. 3 mo. 14 da.
295. 9 mo. 3 da.
296. 1 yr. 4 mo. 6 da.
297. 18 yr. 1 mo. 20 da.
298. 6 yr. 8 mo.
299. 4 yr. 2 mo., or Mar. 1, 1882.
300. 36 yr. 9 mo. 17 da.
301. 1 yr.
302. 6 yr. 7 mo. 10 da.
303. 4 yr. 9 mo. 15 da.
304. 2 yr. 11 mo. 24 da.
305. 7 mo. 24 da.
306. 30 da.
307. 37 yr. 11 mo. 28 da.
308. 6 mo. 8 da.

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309. $99.461+.
310. $39.742+.
311. $106.127+.
312. $113.03+.
313. $203.595+.
314. $58.657+.
315. $950.1569+.
316. $50.
317. $120.
318. $150.
319. $476.93+.
320. $300.
321. $4439.04+.
322. $500.
323. $30.
324. $85.
325. $33.756+.

Page 22.

326. $478.47.
327. $575.37.
328. $446.13.
329. $170.74.
330. $1117.30.
331. $1569.23.
332. $424.947.
333. $981.56.

Page 23.

334. $249.016.
335. $223.213.
336. $165.215.
337. $1356.30.
338. $765.91.
339. $699.02.
340. $59.41.

Page 24.

341. $128.51.
342. $7.22.
343. $93.46.
344. $566.83.
345. $118.23.
346. $15.26.
347. $96.23.
348. $21.02.
349. $1610.08+.
350. $18.16.
351. $500 at 9% by $5.528.
352. $619.28.
353. $10 gain.
354. $24.80.
355. $1065.805.
356. $6.66.

Page 25.

357. $590.70.
358. $839.59+.
359. $895.05.
360. $11.375.
361. $1227.40.
362. $1577.60.
363. $560.34.
364. $594.27.
365. $.26.
366. $308.72.
367. $593.20.
368. $745.375.
369. $360.63.
370. $1591.29.
371. $1255.98.
372. $795.60.
373. $1202.01.

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374. $1356.81.
375. $999.
376. $1176.24.
377. $805.93.
378. $1143.48.
379. $833.97.
380. $1005.85.
381. $645.915.
382. $810.81.
383. $595.68.
384. $437.90.
385. $569.63.
386. $947.18.
387. $2953.50.
388. $296.80.
389. $296.85.
390. $.44.
391. $2576.475.

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392. $505.305.
393. $773.59+.
394. $625.465+.
395. $600.
396. $1000.
397. $608.52+
398. $848.71.
399. $619.33.
400. $736.41+.
401. $704.51.
402. $577.08.
403. $859.32.
404. $748.10.
405. $1005.926+.
406. $404.22.
407. $658.06.
408. $860.54.

Page 28.

409. $621.99.
410. $1210.76+.
411. $721.33.
412. $2161.89.
413. $2587.16+.
414. $628.76+.
415. $800.19.
416. $474.29.
417. $838.60.
418. $101.06.
419. $627.02.
420. $46.82.
421. $12510.42+.
422. $200.
423. $5996.37.

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424. $120.
425. $1600.
426. $360.
427. $1525.
428. $1632.
429. $3600.
430. $1000.
431. $720.
432. $80.
433. $500.
434. The 6% $19 more.
435. $24 less.
436. 116⅔.
437. No difference.
438. $120.

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439. $6\frac{18}{17}\%$.
440. $5\frac{15}{17}\%$.
441. $7\frac{1}{7}\%$.
442. $5\frac{5}{28}\%$.
443. $4\frac{1}{2}\%$; $1\frac{1}{4}\%$ higher.
444. $7\frac{23}{53}\%$.
445. $8\frac{1}{3}\%$.
446. $4\frac{28}{43}\%$.
447. $6\frac{1}{4}\%$.
448. $5\frac{55}{109}\%$.
449. $7\frac{9}{13}\%$.
450. $\frac{1}{8}$ increase.
451. $5\frac{15}{17}\%$.
452. $5\frac{20}{21}\%$.
453. $9\frac{1}{11}\%$.
454. $4\frac{13}{28}\%$.
455. $7\frac{1}{7}\%$.

Page 31.

456. $77760.
457. $27675.
458. $18125.
459. $9000.
460. $27913.
461. $10800.
462. $7150.
463. $36720.
464. $32940.
465. $6390.
466. $35000.
467. $21320.
468. $5428.57\frac{1}{7}$.
469. $9360.
470. $15640.
471. $34687.50.

Page 32.

472. $83\frac{1}{3}$.
473. $133\frac{1}{3}$.
474. $110\frac{10}{19}$.
475. $11\frac{1}{9}$.
476. $91\frac{8}{17}$.
477. $111\frac{1}{9}$.
478. 75.
479. $66\frac{2}{3}$.
480. $82\frac{6}{17}$.
481. 90.
482. $109\frac{1}{11}$.
483. $117\frac{11}{17}$.
484. 75.
485. 150.
486. 80.
487. $112\frac{1}{2}$.
488. $119\frac{1}{7}$.

Page 33.

489. $128.80.
490. $1243.125.
491. $476.25.
492. $802.56.
493. $51.84.
494. $60.45.
495. $1623.25.
496. $436.60.
497. $3055.04+.
498. $3142.85+.
499. $887.718.
500. $1953.125.
501. $256.41.

502. \$1123.13.
503. \$285.71.
504. \$240.
505. \$8333.33$\frac{1}{3}$.

Page 34.

1. $\frac{21}{40}$.
2. $\frac{11550}{107521}$.
3. $\frac{175}{192}$.
4. $\frac{9905}{19716}$.
5. 13.13955.
6. $\frac{1203}{6602}$.
7. $\frac{8}{25}$.
8. $\frac{121}{64}$.
9. $\frac{55}{50}=1.1$.
10. $\frac{875}{602}$, or $1\frac{39}{86}$ yd.
11. \$11.625.
12. 49 mi. 70 rd. 2 yd. 1 ft. 6 in.
13. $\frac{446}{875}$.
14. $35\frac{3805}{3927}$.
15. 3 : 4, or $\frac{3}{4}$.
16. $\frac{216}{155}$, or $1\frac{61}{155}$.

Page 35.

17. 672 : 7, or 96.
18. 5.0292.
19. $\frac{500}{1893}=.26413+$.
20. $\frac{625}{23328}=.02679+$.
21. 10.
22. $5\frac{9}{23}$ oz.
23. \$19250.
24. \$80960.
25. \$12.064.
26. $374\frac{4}{19}$ lb.
27. $111\frac{21}{44}$ acres.
28. 20 men.
29. \$$4\frac{26}{31}$.
30. $7\frac{7}{8}$ days.
31. 24 men.
32. 22 mi. $146\frac{2}{43}$ rd.
33. .02851663 cu. met.
34. .0457 + dekam.

Page 36.

35. \$$5090\frac{30}{123}$.
36. $22\frac{10}{17}$ da.
37. \$$10.20\frac{20}{49}$.
38. \$.4506.
39. $60\frac{60}{89}$ hr.
40. \$11348.83 +.
41. $835\frac{145}{288}$ lb.
42. \$$5.0032\frac{1}{4}$.
43. $6\frac{9}{103}$ da.
44. \$475.
45. \$2218.96.
46. \$$27\frac{177}{343}$.
47. \$1.15.
48. $261\frac{95}{156}$ bu.
49. 15 barrels.
50. $43\frac{19}{42}$ barrels.

Page 37.

51. $8\frac{3754}{3975}$ acres.
52. $19\frac{503}{900}$ hours.
53. \$$36.990\frac{15}{16}$.
54. \$30.25.
55. \$$3833\frac{1}{3}$.
56. \$24.
57. $1\frac{2}{5}$ days.
58. $10\frac{4}{5}$ hours.
59. $22\frac{4}{5}$ days.
60. B's, \$7400.
61. 6 men.
62. 409.5 yd.
63. \$6.65.
64. $9\frac{1}{5}$ hours.

Page 38.

65. A's, \$5.28; B's, \$5.94.
66. $\frac{4}{5}$.
67. 252; $3\frac{8}{9}$; $21\frac{9}{11}$; $92\frac{287}{1584}$; $1\frac{1}{10}$; $\frac{4}{9}$.
68. \$$163.77\frac{16}{17}$.
69. \$$16\frac{4}{5}$.
70. \$950.
71. 2 yr. 6 mo.
72. $1011\frac{1}{2}$ bricks.
73. \$16.80.
74. 32 men.
75. 12 horses.
76. $6\frac{17}{18}$ cents.
77. \$12.968 +.

Page 39.

78. $13\frac{1}{2}$ days; boy $\frac{1}{4}$ as much as a man.
79. 256 stones.
80. $\frac{25}{27}$ lb.
81. \$86.40.
82. \$3.38.
83. $112\frac{1}{2}$ hundred.
84. \$20477.27 +.
85. \$46.08.
86. 6 days.
87. \$$8.88\frac{3}{4}$.
88. \$$17.99\frac{47}{272}$.

Page 40.

89. £3 13 s. $8\frac{4277}{16892}$ d.
90. $41\frac{1}{7}$ days.
91. $3\frac{79}{88}$ days.
92. \$257.25.
93. $372\frac{3}{4}$ miles.
94. 12 boys.
95. 6 of each.
96. \$1500.
97. 15 hours.
98. 6 mo. 12 da.

Page 41.

1. A's, \$$10869\frac{13}{23}$; B's, \$$5434\frac{18}{23}$; C's, \$$8695\frac{15}{23}$.

2. A's, $1107\frac{9}{13}$; B's, $492\frac{4}{13}$.
3. $173.10; $865.50; $1211.70.
4. $2285\frac{5}{7}$; $2666\frac{2}{3}$; $3047\frac{11}{11}$.
5. $1562.50; $5937.50
6. A's, $1366\frac{11}{13}$; B's, $2083\frac{1}{13}$; C's stock, $1152\frac{4}{13}$.
7. A's, $7955\frac{15}{17}$; B's, $5044\frac{2}{17}$.
8. $1540; $1760.
9. $949\frac{2}{3}$; $664\frac{1}{3}$; $911\frac{1}{9}$; $474\frac{4}{9}$.
10. A's, $5000; C's, $6000.
11. $1466\frac{2}{3}$; $2933\frac{1}{3}$.

Page 42.

12. $333\frac{1}{3}$; $666\frac{2}{3}$; $1000; $1333\frac{1}{3}$.
13. $448; $192.
14. Brown, $3960; Evans, $1980; Walton, $297.
15. $350.
16. $2700.
17. A's, $3140; B's, $3480.
18. A's, $400; B's, $810.
19. $7424.
20. A's, $2376; B's, $4224.
21. $8\frac{8}{20}$ mo.
22. $2\frac{11}{15}$ mo.

Page 43.

23. C, $2800.
24. $305.50; $235; $305.50.
25. $154\frac{24}{165}$; $545\frac{141}{165}$.
26. A's, $288; B's, $312; C, 15 mo.
27. July 9.
28. July 31.
29. Jan. 14.
30. 2 yr. 9 da.
31. Dec. 10.

Page 44.

32. 4 mo. 7 da.
33. 4 mo. 11 da.
34. 11 mo. 20 da.
35. 4 mo. 21 da.
36. Oct. 7.
37. Dec. 8.
38. 6 yr. 3 mo.
39. 3 mo. 18 da.
40. 42 da.
41. 54 days after the equated time.

Page 45.

42. 9 mo. from May 1.
43. $1\frac{4}{5}$ mo.
44. $59\frac{4}{5}$, or 60 da.
45. July 1, 1879.
46. June 30, "
47. July 5, "
48. Feb. 15, 1880.
49. Sept. 19, 1879.
50. Sept. 5, "
51. June 23, "
52. July 25, "
53. Aug. 4, "
54. Oct. 19, "

Page 46.

55. Jan. 20, 1880.
56. Mar. 28, "
57. Sept. 16, 1879.
58. Oct. 12, "
59. July 26, "
60. Nov. 8, "
61. Dec. 23, "
62. Eq. T. Apr. 16, '79; C. B., $480.95.
63. Eq. T. Dec. 11, '79; C. B., $280.99.
64. Eq. T. Feb. 14, '83; C. B., $81.
65. Eq. T. Jan. 25, '81; C. B., $112.20.

Page 47.

66. Eq. T. Oct. 3, '79; C. B., $1167.32.
67. Eq. T. Apr. 23, '64; C. B., $42.036.
68. Eq. T. July 17, '79; C. B., $508.498.
69. Eq. T. May 19, '78; C. B., $221.38.
70. Eq. T. Oct. 9, '78; C. B., $451.43.
71. Eq. T. Feb. 11, '79; C. B., $2145.41.

Page 48.

1. $75.
2. $1120; $1080.
3. $26\frac{4}{19}\%$.
4. $23\frac{70}{103}$.
5. 14%.
6. $3\frac{13}{17}$; $12\frac{4}{17}$.
7. $2.70.
8. 9 men.
9. A, $540; B, $1800; C, $360.
10. $261\frac{7}{13}$.
11. $500.
12. A's, $108; B's, $168.

Page 49.

13. John, $60; Henry, $140.
14. $11\frac{3}{7}$ gal.
15. $13.699+.
16. $55\frac{94}{171}$ acres
17. $98\frac{1}{12}$ yd.
18. $88.05\frac{1}{2}$.

19. \$871$\frac{17}{11}$.
20. 14$\frac{11}{14}$ days.
21. 8$\frac{33}{77}$ days.
22. \$25600.
23. \$35555$\frac{5}{9}$.
24. \$144.384.
25. \$1.8834.
26. 7$\frac{311}{430}$ barrels.

Page 50.

27. \$13.395.
28. \$.4636.
29. \$1662$\frac{403}{1000}$.
30. \$211.
31. 190 bu. 3 pk. 6$\frac{10}{149}$ qt.
32. $\frac{111}{145}$ da.
33. \$6$\frac{2}{83}$; \$95$\frac{11}{83}$; \$84$\frac{23}{83}$.
34. 53$\frac{11}{17}$.
35. 7 cows; 21 horses; 42 sheep.
36. \$4200.
37. A, 7 yr.; B, 14 yr.; C, 42 yr.
38. 3$\frac{133}{475}$ min. after 12 M.
39. \$600; \$500.
40. 25% loss.

Page 51.

1. 289; 4913.
2. 729; 6561.
3. 20736; 248832.
4. 4084101; 85766121
5. 7294973; 810000.
6. 3$\frac{17}{36}$; 16384.
7. 140625; 1936.
8. $\frac{21}{44}$; 16875000.
9. 380$\frac{1}{4}$; .000036.
10. 10.648; 15625.
11. $\frac{343}{512}$; $\frac{243}{1024}$.
12. $\frac{4}{36}$; $\frac{9}{16}$.
13. $\frac{1}{8}$; $\frac{1}{16}$.
14. 4096; 4096.
15. 1771561; 19487171.
16. .000064; .000000512.
17. .064; .0256.
18. 1384.5841; 8445.96301.
19. .1369; .050653.
20. 2.8561; 3.71293.
21. 166.375; 43046721.
22. .000004; .000000008.
23. $\frac{1}{343}$; $\frac{1}{64}$.
24. $\frac{1}{40960}$.
25. 6561; 1024.
26. 175^{20}; 6^{28}.
27. $(90+9)\times(90+9)\times(90+9)=970299$.
28. 17^5.

Page 52.

29. 3057. 9.16078+.
30. 4141. 3.16227+.
31. 91.59694+. 10.10247+.
32. 16.12451+. 1309.49917.
33. 9.859. 729.
34. 9668. 2.80178+.
35. 29.88310+. 9999.
36. 11$\frac{1}{3}$. 75.38567+.
37. 27. .29883+.
38. 8$\frac{1}{4}$. 22.36067+.
39. 4.6. 2.64575+.
40. 9.001. .86602+.
41. .63245+. 6561.
42. 86.60254+. 1.61245+.
43. .03162+. 3.00149+.
44. 1.96900+. 35.44009+.
45. 6.22655+. 26.46696+.
46. 9.48683+. 99.90495+.
47. 121. .79002+.
48. 920. $\frac{13}{17}$.
49. .05386+. 89.
50. 31. 4004.
51. 720. 303.
52. 99. 426.
53. 222. .02154+.
54. $\frac{5}{8}$. 32.55999+.
55. 3.68403+.
56. $\frac{4}{7}$. 110.38512+.
57. $\frac{2}{3}$. 64.63304+.
58. .101639+. 2.46621+.
59. .71814+. .02223+.
60. 7.77498+. 36.08826+.
61. 16.75068+. 30.36588+.
62. 306. 28.84499+.
63. 7009. 13.44419+.
64. 46.41588+. 5.3.

Page 53.

1. 288 sq. ft.
2. 850 sq. ft.
3. 1446.25 sq. ft.
4. 34 acres, 102.272 rd
5. 11088 sq. yd.
6. 24024 sq. ft.
7. 89544 acres.
8. 277200 sq. rd.
9. 36960 sq. in.
10. 278.5 ft.
11. 4272.5 yd.
12. 191 ft. 5 in.

13. 1418 ft.
14. 1952.88 yd.
15. 346.07 yd.
16. 197.5 ft.
17. 1558 ft.
18. 965.086+yd.
19. 643.539 ft.

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20. 1.414213 ft.
21. 15.556 ft.
22. 29 sq. yd. 7 sq. ft. 108 sq. in.
23. 220 sq. yd. 6 sq. ft. 126 sq. in.
24. 35 sq. yd. 5 sq. ft. 24 sq. in.
25. 128 sq. yd. 6 sq. ft.
26. 22 sq. yd. 7 sq. ft. 48 sq. in.
27. 7 sq. yd. 1 sq. ft. 108 sq. in.
28. 12 acres 136 sq. rd.
29. 38 acres 46.4896 sq. rd.
30. 22 acres 138.5472 sq. rd.
31. 14 acres 102.4 sq. rd.
32. 13 acres 80 sq. rd.
33. 1 acre 33 sq. rd. 4 sq. yd. 2 sq. ft. 36 sq. in.
34. 1 A. 42 sq. rd. 5 sq. ft. 72 sq. in.
35. 48.4 yd.
36. 1280 chains.
37. 166 rd. 3 yd. 2 ft.
38. 155.563 + yd.
39. 50 feet.
40. 1 A. 34 sq. rd. 24 sq. yd. 7 sq. ft. 72 sq. in.
41. 816 bricks.

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42. 13 sq. ft. 72 sq. in.
43. 5 sq. yd. 3 sq. ft.
44. 21.78 sq. yd.
45. 30 sq. rd.
46. 5 chains.
47. 357.21⅜ yd.
48. 82 sq. rd. 9 sq. yd. 1 sq. ft. 72 sq. in.
49. 69.33 sq. rd.
50. 1260 sq. ft.
51. 5000 sq. ft.
52. .9937+yd.; 24.99 ft.; 325.00009+ft.
53. 219.9999+yd.; 87.9648 in.; 18.0642 ch.
54. 3.18309 yd.
55. 34.377+yd.
56. 7.957+ft.
57. 80.373+ft.; 3.43773+ch.
58. 541.3375+yd.; 126.2891+ft.
59. 49.97451 rd.; 566.5902+yd.
60. 115.3870639+ch.; 3.0239 yd.

Page 56.

61. 31416 sq. ft.; 1963.5 sq. yd.
62. 502 A. 104.96 sq. rd.; 3.1416 sq. ch.
63. 2.407295 sq. ch. 257 A. 134.272 sq. rd.
64. 1813.168 sq. yd.
65. 615.7536 sq. in.; 22.99862 sq. yd.
66. R. 39.25 yd.; Cir. 246.618 yd.
67. Diam. 1404.275 yd.; Cir. 4411.67 yd.
68. 1570.8 sq. ft.
69. 995.49 lb.
70. 11.209 ft.
71. 12.7278 yd.
72. 55.508 yd.
73. .2251 yd.
74. 2000 yd.
75. 224.9734 yd.
76. 1.414 yd.
77. 226.1952 sq. ft.
78. 11.45952 sq. ft.
79. 5.065965+sq. ft.

Page 57.

80. 144 sq. ft.
81. 110.5 sq. ft.
82. 374 sq. ft. 12 sq. in.
83. 104390 sq. yd.
84. 1094.8476 sq. ft.
85. 5.780544 sq. ch.
86. 31101.84 sq. yd.
87. 7483.9893+sq. yd
88. 486 sq. ft.
89. 1395.635386 sq. ft.
90. 217.061616 sq. ft.
91. 18.8496 sq. yd.
92. 226.9806 sq. ft.
93. 6 sq. rd.
94. 4 sq. yd.
95. 6700 sq. yd.
96. 10.313+in.

Page 58.

97. 33.5104 yd.
98. 1728 cu. ft.
99. 2970 cu. ft.
100. 2281½⅞ cu. ft.
101. 7564.5 cu. ft.
102. 351.8592 cu. ft.
103. 667.590 cu. ft.
104. 1770.2916 cu. ft.
105. 4557.4144 cu. ft.
106. 1¼ ft.
107. 1 ft. 10$\frac{41}{144}$ in.
108. 166⅜ yd.
109. 11377⅞ miles.
110. 10.092 ft.
111. 34.15 in.
112. 26.048 ft.
113. 73.957 in.
114. 29.08⅜ cu. yd.
115. 8333⅓ cu. yd.
116. 20941.1712 gal.
117. 981.75 cu. ft.

Page 59.

118. 175 sq. ft.
119. 164.353872 sq. yd
120. 233 sq. ft.
121. 108 sq. ft.
122. 43.9824 sq. ft.
123. 66.759 sq. ft.
124. 904.7808 sq. ft.

125. 296.8812 sq. ft.
126. 2.3562 sq. ft.
127. 73½ cu. ft.
128. 15512 cu. in.
129. 149626⅔ cu. in.
130. 9 cu. yd.
131. 452.3904 cu. in.
132. 1696.464 cu. in.
133. 9.7738⅔ cu. yd.
134. 41.888 cu. ft.
135. 27 ft.
136. 6.307 in.
137. 6.445 ft.
138. .2267188 cu. ft.
139. 17 ft. 3 in.
140. 15084 cu. yd. 25.5 cu. ft.

Page 60.

141. 1095.931032 sq. yd.
142. 252.27048 sq. ft.
143. 867.3270375 sq. ft.
144. 958.6639524 sq. yd.
145. 1260 cu. in.
146. 151⅔ cu. ft.
147. 302.8925935 cu. ft.
148. 784 cu. in.
149. 1061.8608 cu. ft.
150. 508.2410⅔ cu. yd.
151. 628948.32 cu. in.
152. 125338.5 cu. in.
153. 59828.6304 sq. in.
154. 2812.58716 sq. in.
155. 30171.9264 sq. in.
156. 1256.64 sq. ft.
157. 6.809 + sq. yd.
158. 1.4186 + sq. yd.

Page 61.

159. 2460.61729 + cu. ft.
160. .5236 cu. ft.
161. 787.86383 cu. in.
162. 66.4972 cu. ft.
163. 381.1808 cu. in.
164. 531.9776 cu. in.
165. 136$\frac{17}{18}$ lb.
166. 1.2406 + ft.
167. 32 lb.
168. 19.23 + in.
169. 237.8016 lb.
170. 24652.3144 + cu. in.
171. 1.382 : 1.
172. 1.2247 : 1.
173. 1 : 1.1447.
174. 8.574 in.
175. 27 : 125.

Page 62.

176. 37.6992 cu. ft.; 75.3984 sq. ft.
177. 11.18 : 1.
178. 721.11 + yd.
179. 867 sq. yd.
180. 122.5224 sq. ft.
181. 3.0149 +.
182. 1613⅓ cu. yd.
183. 22.871 yd.; 15.044 yd.; 12.085 yd.
184. 628.01 in.
185. 1 mile.
186. 280.0142 in.; 30790.8216 sq. in.
187. 24 ft.
188. 1696.464 cu. ft.

Page 63.

189. 101.4197 + gal.
190. 148.936 + gal.
191. 121.756 + gal.
192. 144.092 + gal.
193. 133.28 + gal.
194. 161.215 + gal.
195. 13.711 + gal.
196. 148.844 + gal.
197. 31½ gal.
198. 1233 sq. ft. 48 sq. in.
199. 3300 sq. ft.
200. 615 sq. ft. 54 sq. in.
201. 1155 sq. ft. 80 sq. in.
202. 413 sq. ft. 63 sq. in.
203. 397.936 cu. ft.
204. 398.1299 cu. ft.
205. 598.4748 cu. ft.

Page 64.

206. 51630 + bricks.
207. 125461 + bricks.
208. 25815 + bricks.
209. 121976 + bricks.
210. 10981 + bricks.
211. 580840 + bricks.
212. 12694 + bricks.
213. 234589 + bricks.
214. 609 + bricks.
215. 3709 + bricks.
216. 8103⅜ lb.
217. 945 lb.
218. 165⅜ lb.
219. 780 lb.
220. 12 T.
221. 5 tons 368 lb.
222. 29 tons 320 lb.
223. 69 tons 1968 lb.
224. 12 tons 192 lb.
225. 27 tons 1566 lb.

Page 65.

1. 56841 mm.
2. 3600 decisteres.
3. 3230 times.
4. 649000 revolutions
5. 35 minutes.
6. 52639 m. per hour.
7. 3883.7 m.
8. $14.
9. 680000000 mm.
10. 10554.975 steres.
11. He loses 875 francs.
12. 3.5 m.

Page 66.

13. 4972 liters.
14. 639 minutes; 423 minutes.
15. 9655 francs 20 centimes.
16. .0193617 kilos.
17. 3.08 m.
18. 6 days.
19. 270000 bricks.
20. 5 Km. 220 m.
21. $17\frac{423}{1977}$ days.
22. 17.99 francs; 35.98 francs; 107.94 francs.
23. 158 of each of the first two and 79 of each of the last three coins.
24. $7\frac{1}{2}$ days.
25. 25000 flagstones.

Page 67.

26. 7 dm. 1 cm. 5.9 mm.
27. 28 francs 21.875 c.
28. 9000 francs.
29. 8 years.
30. $4\frac{1}{2}$ days.
31. 15 francs 14 centimes, nearly.
32. 37 francs 53 centimes, nearly.
33. 78 Kg.
34. He gained 2031 francs $33\frac{3}{4}$ centimes.
35. First, 3 francs 25 centimes; Second, 4 francs 63 centimes.
36. $51.18.

Page 68.

37. 850 francs.
38. (1) 500 francs $26\frac{1}{4}$ centimes; (2) 446 francs $6\frac{1}{4}$ centimes.
39. 15781 ft.
40. 158664.2837 inches
41. 24855.2 miles.
42. 16746 steres.
43. 204749 sq. miles.
44. 1956 cu. m. 335 cu. dm.
45. 49 g. 3 qt.
46. 2.6096 Hl.
47. 94.44 lbs.
48. 1.03706 Kg.
49. 25.3995 cm.; 60.9373 Kg.; 4457.63 m.

Page 69.

1. $\frac{473}{2976}$.
2. A, $£10\frac{240}{1101}$; B, $£22\frac{616}{1101}$; C, $£57\frac{248}{1101}$.
3. $\$17.81\frac{5}{8}$.
4. $\$.2418\frac{569}{781}$.
5. .003892632.
6. 26.7019+rd.
7. 1600.
8. $4.662+.
9. 18 spoons.
10. $101.50.
11. .669432+.

Page 70.

12. 226.2741+rd.
13. $5077.00+.
14. 4.
15. $33\frac{81}{176}$.
16. $19.83\frac{61}{64}$ cords.
17. 600 yd.
18. $1485.507+.
19. $411.06.
20. $\$63\frac{63}{124}$; $\$38\frac{13}{124}$; $\$27\frac{27}{124}$; $\$21\frac{21}{124}$.
21. .02.
22. 2500 sq. ft.
23. 10%.
24. 6.408864 sq. ft.
25. 45045.
26. 76.6+gal.
27. 52070.94+lb.
28. $58.894+.

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29. $10\frac{70}{223}\%$.
30. $3076.92+.
31. .7.
32. 21.8%.
33. $1900.67.
34. 70 horses.
35. 12 hr. 47 min. 12 sec. P. M.
36. $\$.79\frac{6}{11}$; $\$.95\frac{5}{11}$.
37. $\frac{84}{175}$ lb.
38. $7\frac{68}{143}$ da.
39. $5\frac{1}{2}\%$.
40. $22\frac{6}{77}\%$.
41. $5700.
42. $1800.
43. 75%.

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44. 3 yr. 3 mo.
45. $\$322\frac{1}{12}$.
46. $1000.26.
47. 2.427+cu. yd.
48. $327.047+.
49. 48 tons 480 lb.
50. $112\frac{1}{2}\%$.
51. $59' 8\frac{134}{143}''$.
52. $\$.90\frac{119}{121}$.

53. $1167.96.
54. 35.355 ft.
55. 431970 lb.
56. 1931.70\frac{9}{11}$.
57. 1.414213.
58. 20%.
59. $2500.
60. 503.12\frac{1}{2}$.

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61. 60 days.
62. 12.41+yd.
63. $.34 per lb.
64. 7$\frac{3}{8}$%.
65. 81$\frac{9}{11}$.
66. $2.80.
67. $120.
68. .20800+.
69. 33$\frac{1}{3}$%.
70. $.42$\frac{1}{2}$.
71. $507.959+.
72. 693$\frac{1}{3}$ feet.
73. 3$\frac{7}{81}$%.
74. $.90.
75. 1.5 feet.

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76. $9570.47+.
77. 43.301+feet.
78. 4.3%.
79. 7.457 feet.
80. $.06$\frac{4}{8}$.
81. 22.429+sq. ft.
82. $28500.
83. 180.10\frac{5}{12}$.
84. 250.
85. .036036.
86. 34444\frac{4}{9}$.
87. 16000 lb.
88. $\frac{1}{1}\frac{8}{8}\frac{8}{0}\frac{1}{0}$.
89. 2\frac{7}{9}$.
90. 7 : 9 : : 21 : 27.
91. 1 yr. 6 mo.
92. 216 balls.
93. 1 mo. 28 da.
94. $400.

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95. 5%.
96. 23916+bricks.
97. $938.36+.
98. 17$\frac{11}{17}$%.
99. $\frac{5}{8}$.
100. 216 lb.
101. 400 lb.
102. 67$\frac{1}{3}$; 44$\frac{4}{9}$.
103. .000000000625.
104. 29.189+ft.
105. $221.63+.
106. $2914.28+.
107. 75%, or 1800 sq. ft.
108. 22 mo. after the 9 mo.
109. .75+cu. ft.

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110. 366$\frac{53}{219}\frac{94}{41}$ sidereal days.
111. $\frac{2}{45}$.
112. .00001$\frac{44}{81}$ sq. yd.
113. 93 days.
114. 320 acres.
115. 128.9+bu.
116. $6656.80+.
117. 64800 ft.
118. $3055.24+.
119. 4.8358+sq. ft.
120. 13 mi. 168 rd. 3 yd. 1 ft. 1$\frac{5}{7}$ in.
121. 25%.
122. 5$\frac{1}{1}\frac{1}{4}\frac{1}{4}\frac{5}{5}$ %.
123. 2.7+mo.
124. 39.
125. A, 564\frac{1}{11}$;
B, 3225\frac{3}{11}$;
C, 1209\frac{2}{11}$.
126. 343686343.
127. 10735 grains.
128. $223.875.

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129. 73.
130. 37$\frac{1}{2}$%.
131. 90$\frac{10}{21}$%.
132. 9$\frac{1}{11}$%.
133. 22222\frac{2}{9}$.
134. 4$\frac{1}{2}$%.
135. 2.
136. 3$\frac{1}{4}$%.
137. 11.8+%.
138. 46+days.
139. 50.269+gal.
140. $467.94; (244 da.)
141. 38.88\frac{8}{9}$.
142. £13 6 s. 3 far.
143. $40276.88+.
144. 277\frac{187}{200}$;
926\frac{666}{200}$;
1215\frac{1}{2}\frac{8}{0}\frac{8}{0}$.

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145. .926$\frac{8}{9}$ lb.
146. 18.675 lb.
147. $605.33.
148. 13 yr. 1 mo.
149. $\frac{1}{250000}$ in.
150. $2.
151. 3893.51\frac{1}{2}$.
152. 3.00369+.
153. $56.157+.
154. The 34th day.
155. $47.71+.
156. 22$\frac{1}{2}$%.
157. 6$\frac{1}{16}$%.

158. 1.035+.
159. 16.12451+; 6.3825+.

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160. .000000000006.
161. $1919.44.
162. 2016\frac{12}{43}$; 533\frac{31}{43}$.
163. Eq. T. Apr. 25,'79; C. B. $735.709+.
164. $\frac{13792881}{32080621}$.
165. 16.40+in.
166. $244 profit; 61%.
167. 20$\frac{2}{3}$ yd.
168. $611.99+.
169. $5.3058 gain.
170. .1283$\frac{19}{132}$ mi.
171. 39.3699+in.
172. 45$\frac{3}{8}$%.

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173. 1331$\frac{19}{51}$ yd.
174. 129.96+lb.
175. 21$\frac{9}{11}$% by average; 19$\frac{1}{2}$% by annuities.
176. 10$\frac{16930}{18207}$%.
177. 80%.
178. $\frac{7}{9}$.
179. 1.784 ft.
180. 11$\frac{1}{12}$ yd.
181. $2.65+.
182. 105.46\frac{7}{8}$.
183. $\frac{2}{31}$.
184. 5 qt. $\frac{19}{52}$ pt.
185. 221$\frac{79}{121}$ days.
186. $\frac{2112}{25}$.
187. 42 ft.
188. 17$\frac{9}{11}$%.

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189. 125.
190. $62.684+; $62.738+.
191. 3 hr.
192. $1278.98+.
193. 2.828+gal.
194. 9039.
195. 1.692 ft.
196. 68906$\frac{1}{4}$ board ft.
197. 1 ton 473$\frac{1}{3}$ lb.
198. 1735$\frac{5}{7}$ tons.
199. $\frac{844497}{908267}$.
200. 2$\frac{13}{25}$ hr.
201. $11.47+.
202. $\frac{2003}{28807}$.
203. 1 hr. 5$\frac{5}{11}$ min.; 2 hr. 10$\frac{10}{11}$ min.; 3 hr. 16$\frac{4}{11}$ min.; 4 hr. 21$\frac{9}{11}$ min.; 5 hr. 27$\frac{3}{11}$ min.; 6 hr. 32$\frac{8}{11}$ min.; 7 hr. 38$\frac{2}{11}$ min.; 8 hr. 43$\frac{7}{11}$ min.; 9 hr. 49$\frac{1}{11}$ min.; 10 hr. 54$\frac{6}{11}$ min.; 12 hr.

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204. 38.
205. $541.29+.
206. 312$\frac{1}{2}$ ft.
207. $\frac{16337}{24739}$; .6603+.
208. 7 yr. 3 mo. 5 da.
209. 5.71\frac{3}{7}$.
210. $.92$\frac{36}{217}$.
211. 6$\frac{1}{2}$%.
212. 4783+bricks.
213. 22000 sq. yd.
214. 1$\frac{13}{50}$ gal.
215. .21875 hr.
216. 1.984+in.
217. $\frac{49}{1980}$.
218. 1$\frac{19}{75}$ in.
219. 13$\frac{365033}{549109}$%.
220. 7644 lb.

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221. 91$\frac{3}{7}$.
222. £39 16 s. 5$\frac{308}{481}$ d.
223. 42$\frac{1}{2}$ grains.
224. 333$\frac{1}{3}$ ft. and 200 ft. per sec.
225. .0006$\frac{32}{63}$.
226. 9$\frac{3}{8}$ cents.
227. 28 yd.
228. 54 pears.
229. 11$\frac{109}{256}$ days.
230. $\frac{16}{171}$.
231. .000004.
232. 710.5 sq. ft.
233. 875 prescriptions.
234. 70.014+in.
235. 33$\frac{1}{3}$%.

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236. £1 11 s. 9.4 d.
237. $2564.10.
238. 121 yd.
239. 31.44+sq. ft.
240. $5674.87+.
241. $887.92.
242. $3.75.
243. 7$\frac{343}{3951}$%.
244. $.31$\frac{11}{19}$ per lb.
245. 7%.
246. 2748.9 lb.
247. 452.3904+in.
248. .00006.
249. 25.455+in.
250. 139515+bricks.
251. 56.
252. 27$\frac{3}{4}$; 9$\frac{3}{4}$.

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253. \$140.938.
254. \$2492.825.
255. $\frac{405}{1216}$.
256. 729.
257. $4\frac{4}{19}$ hr.
258. 153 ft. 11′ 6″ 2‴ 3⁗.
259. 354.465 + lb.
260. 19.013 in.
261. \$2226.
262. 14 yr. 2 mo. 13 da.
263. .0000000502 + A.
264. $14\frac{838}{1083}$ yd.
265. $12\frac{1}{2}$% gain.
266. $41\frac{8}{10}$%.
267. 410.03 + rd.
268. 13%.
269. \$9656.25.

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270. \$2.686 +.
271. 40 + days.
272. \$22 gain.
273. 101362 + bricks.
274. \$1072.60 +.
275. 2, 3, 3, 11, 13, 31.
276. $1\frac{49}{51}$%.
277. 1.732052 sq. yd.
278. \$792.891.
279. $\frac{375751}{566997}$; .66270 +.
280. \$20833$\frac{1}{3}$.
281. \$98.
282. \$15000.
283. $51\frac{83}{117}$ ft.
284. £703 11 s. 8.6 d.
285. $1\frac{1}{2}$%.

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286. $2\frac{21}{22}$ hr.
287. 62.8375.
288. $5\frac{265}{602}$ cu. ft.
289. $\frac{6}{5}$.
290. \$51.50 +.
291. $\frac{40}{49}$.
292. 25%.
293. $16\frac{2}{3}$%.
294. 16.9705 in.
295. $37\frac{19}{48}$ lb.
296. 11.753 + cu. ft.
297. 6 hr. 19 min. 24 sec.
298. \$1809.52 +.
299. \$1428.57 +.
300. 81.
301. 1488.384 gal.
302. \$428$\frac{4}{7}$; \$571$\frac{3}{7}$.
303. $124\frac{36}{161}$.

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304. $448\frac{64}{77}$ gal.
305. 6%.
306. A, 880.88 yd.;
B, 968 yd.;
C, 880 yd.;
D, 1000 yd.;
A, \$10613.33;
B, \$9737;
C, \$10700;
D, \$10000.
307. $\frac{5297747}{1174238208}$.
308. $130\frac{110690}{138637}$.
309. \$62.183.
310. $41\frac{51577}{71478}$% cheaper.
311. \$900 in 5 mo.; \$900 in 11 mo.
312. \$3000; \$4000; \$5000.

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313. 12 cents.
314. $23\frac{1291}{1653}$ yards.
315. 40 peaches; 12 pears.
316. \$100 each.
317. A, \$14641;
B, \$13310;
C, \$12100;
D, \$11000;
E, \$10000;
E's, $31\frac{10229}{14641}$% less than A's.
318. .83$\frac{1}{3}$.
319. \$1545.
320. \$507.63.
321. 20.
322. A, \$2000;
B, \$2500;
C, \$3000;
D, \$3300.

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323. 72 lb.; \$.88$\frac{8}{9}$ per lb.
324. \$23142$\frac{6}{7}$;
\$15428$\frac{4}{7}$;
\$15428$\frac{4}{7}$.
325. 4 hr. $21\frac{9}{11}$ min.;
4 hr. $54\frac{6}{11}$ min.;
{ 4 hr. $5\frac{5}{11}$ min.;
4 hr. $38\frac{2}{11}$ min.;
{ 4 hr. $10\frac{10}{11}$ min.;
4 hr. $32\frac{8}{11}$ min.
326. 3351.04 cu. ft.
327. $1\frac{1}{3}$ oz. of 12-car.; $1\frac{1}{3}$ oz. of 14-car.; and $5\frac{1}{3}$ oz. of 16-carat.
328. 1.316 +.
329. 1275.
330. 4%.
331. \$878.34 +.
332. \$2101.46.

333. $.\dot{0}3448275862068-9655172413793\dot{1}$.
334. $7.928+.
335. $1640\frac{1}{4}$.
336. $\frac{64}{567}$.
337. $545.074+.

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338. 1.656+francs per gal.
339. $518.86\frac{1}{4}$ francs.
340. 1.37972.
341. 425250 milligrams.
342. 3970.02 centimeters.
343. $\frac{81}{2500}$.
344. .3215%.
345. $7734.907+.
346. $3000.
347. $1838.78+.
348. $20\frac{349}{1148}$% gain.
349. $26\frac{2}{3}$ lb.
350. 1398100.
351. $4871.082+.
352. 30 lb.
353. 11.
354. $\frac{239}{1111111}$.
355. 4.98325249 hectares.
356. 203.105+miles.
357. $.\dot{0}7692\dot{3}$.

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358. 50 lb. of 10-ct.; 50 lb. of 12-ct.; and 200 lb. of 14-ct.
359. $1000.
360. 9 yr. 10 mo. nearly.
361. 25 pounds of each.
362. $35.80+.
363. $187\frac{7}{9}$ meters.
364. $579.15+.
365. 23.0197 kilograms.
366. 31.45 ares.
367. 2 gal. 1 qt. 1.654+ pt.
368. $18\frac{6}{73}$ sec.
369. 3905.
370. $11731.34+.
371. 22201.49+Danish crowns.

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372. 90 bushels.
373. .1 ft.
374. 7668.4005 bu.
375. $12645.9375.
376. 272.4375 kilograms.
377. $.0376\frac{26}{27}$.
378. $6.7054\frac{1}{6}$ days.
379. $\frac{3361}{7875}$.
380. $8657.06+.
381. .2186+.
382. $8806.65+.
383. 509.76 liters.
384. $4117\frac{1}{3}$ ft.
385. $\frac{1}{5}$; $\frac{91}{300}$; $\frac{707}{999}$; $\frac{203}{900}$.
386. 20100.
387. 1.1486+.
388. $.\dot{0}01716998283\dot{}$.
389. $4238.13+.
390. 256.041 lb.
391. 8.
392. 176.2114+kiloliters.

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393. $1839.08+.
394. 66429.
395. $5.837\frac{2}{3}$% gain.
396. 8.4.
397. £2070 7s. $10\frac{66}{161}$d.
398. $\frac{4900}{10973}$.
399. 55.3684728 gr.
400. 7770 francs.
401. 33 lb. 5 oz. 17 pwt. 12 gr.
402. 69 mi. 13 rd. 3 yd $10\frac{2}{9}$ in.
403. $123.35.
404. $\frac{4709}{33300}$.
405. $\frac{800000}{849801}$.
406. $3891.38.
407. 1.0936+.
408. 1.6093.
409. $57.13+.
410. $10\frac{1726}{6105}$.
411. $\frac{5}{7}$.
412. 29.070825 kilometers.
413. $16666\frac{2}{3}$%.

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414. 1.732+ft.
415. $14800.
416. 30 men; 24 men.
417. 600 yards.
418. $24.
419. 24 da.; 16 da.; 12 da.
420. .6933612743+.
421. $815.50.
422. $3\frac{6}{13}$%.
423. $9.49\frac{5}{8}$% premium.
424. 600 lb.

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425. $4\frac{1}{6}$%.
426. $2458.662+.
427. $729\frac{31}{36}$; $730\frac{5}{36}$.

428. 37½% loss.
429. 56¼% gain.
430. $1000.
431. $6063.74.
432. 27.
433. $4\frac{21}{26}$.
434. $86.855+ gain.
435. $435.642.
436. $.47+.
437. 16.996+in.
438. $4212.36+;
$5499.88+;
$3071.107+.

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439. $\frac{7}{143}$.
440. $954.238+.
441. $\frac{13}{63}$.
442. .89089+.
443. 25.215+.
444. 898.178 francs.
445. $5250.
446. 868937142$\frac{8}{7}$ gal.
447. 45.52\frac{178}{187}$.
448. $1409.056+.
449. $1000.
450. $100.01+.
451. $2\frac{3}{5}$%.
452. 91\frac{3}{7}$.
453. 50$\frac{10}{13}$ gal.
454. 95$\frac{5}{14}$ days.

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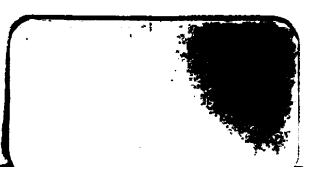
455. $243\frac{45569}{139932}$ eagles.
456. 27222$\frac{3}{5}$ lb.
457. 6.64\frac{228}{361}$.
458. 176\frac{14}{43}$.
459. 11375 apples.
460. 1.4269+.
461. .1135+.
462. 11.34+.
463. $1\frac{1}{19}$ gal.
464. 15.838+meters;
22.397+meters;
27.432+meters.
465. $49\frac{784}{3969}$ min. after 9 o'clock.

THE END.



BUTLER'S SERIES

E. H. BUTLER & CO.